

**THE FORMULATION OF DESIGN: THE CASE OF THE ISLIP COURTHOUSE
BY RICHARD MEIER**

A Dissertation
Presented to
The Academic Faculty

by

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In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in the College of Architecture

Georgia Institute of Technology
May 2006

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*Dedicated to my Father and Mother,
To my brothers and sisters*

ACKNOWLEDGEMENTS

To start a Ph.D. is to embark on a long journey that I knew nothing of five years ago. Now I know that this journey could not have been completed without my family, supportive friends and colleagues, and mentors that worked with me although these years. This work would not have been possible without their support, patience, and constant encouragement. I am thankful for all the people that made this thesis possible.

I am especially grateful to Dr. John Peponis whom without his work, guidance, patience, and constant pushing this thesis would not have been possible. Dr. Peponis has been a distinguished mentor, an advisor and guide, and a close friend: his knowledge was an invaluable source for my studies and his critical questions and intense discussions helped me not only shape this work, but also advance my knowledge. He taught me how to be critical of my work, look beyond what is there, and be patient to obtain the best results. His faith in me meant a lot and his friendship made me feel at home in Atlanta.

I am grateful to Dr. Thanos Economou. As a distinguished scholar with vast knowledge and deep insights, his comments always invited deeper inquiry and critical reflection. The intellectual discussions I had with him regarding architecture, theory, and philosophical issues were always captivating and intriguing and advanced my knowledge beyond the field of architecture. His friendship, support, and companionship made my stay in Atlanta warmer and more memorable.

I am thankful to Dr. Craig Zimring, a scholar, a guide, and a friend who has provided critical knowledge, thoughtful comments, and interesting discussions. Dr. Zimring welcomed me when I first came to Atlanta and has supported me as a vital member of *Courtsweb* during my stay in Atlanta. His academic discussions and critical questions, accompanied with a warm attitude were always academically eye-opening and theoretically refreshing.

I am thankful to Dr. Sonit Bafna for being a critical reader of the thesis with theoretical insights and sharp comments that helped sharpen this work. I also extend my gratitude to Dr. Jean Wineman who acted as an external reader of the thesis. Her comments and discussions helped advance this thesis.

I am grateful to the friendly environment at the Ph.D. program at Georgia Institute of technology: Paula Peche a dedicated research assistant who was always there for all the students and went all the way to support the last crucial semesters at Georgia Tech, and Mercedes Shaghini who helped to make our stay at Georgia Tech easier through her warmth and kindness and through providing all the necessary help to meet the requirements of Georgia Tech. I am also thankful to the community of students at the College of Architecture whom I met and befriended during my stay in Atlanta for all the good times we had and the hard work we went through especially Fehmi, Eduardo, Pati, Keith, Frank, Ghang, and Ranah among the many others.

For the last five years, my family was not with me in Atlanta but they were with me in every step of the way through their love, support, encouragement, and faith in me. Without that, it would have been very hard for me to be where I am now. The love of my parents and the support of the rest of my family were there for me when things got rough and helped me pass through the many difficult times. I could not thank them enough or be more grateful.

Finally, I extend my thanks to the University of Jordan for providing me with the opportunity to pursue my PhD. and to all the people who helped me to be where I am now.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
SUMMARY	xvi
 1 CHAPTER ONE: INTRODUCTION	 1
1.1 REFLECTION AND INTENSION IN DESIGN	1
1.2 METHODOLOGY	6
1.3 THESIS OUTLINE	8
 2 CHAPTER TWO: THEORETICAL FRAMEWORK.....	 10
2.1 INTRODUCTION	10
2.2 UNDERSTANDING BUILDINGS: BUILDING AS LOGICAL FORMS AND BUILDINGS AS SPATIAL ORGANIZATIONS	10
2.2.1 Building Programs as Spatial Organizations	11
2.2.2 Buildings as Logical Forms: the Formal Language of Design	16
2.3 THE ‘WHAT’ AND ‘HOW’ OF DESIGN: FROM BUILDING TO ARCHITECTURE	20
2.4 A GENERAL UNDERSTANDING OF THE DESIGN PROCESS	23
2.4.1 Design as formulation.....	30
2.5 CHAPTER SUMMARY	35
 3 CHAPTER 3: RECONSTRUCTING DESIGN CHARGE, BUILDING PROGRAM AND OBJECTIVE DESIGN CONSTRAINTS.....	 37
3.1 INTRODUCTION	37
3.2 THE GENERAL SERVICES ADMINISTRATION’S DESIGN EXCELLENCE PROGRAM.....	38
3.3 U.S. FEDERAL COURTHOUSE BUILDINGS UNDER THE DESIGN EXCELLENCE PROGRAM.....	45
3.4 DESIGN GUIDANCE AND PROGRAMMATIC CONSTRAINTS AFFECTING COURTHOUSE PLANNING	49
3.4.1 The Courtroom	54
3.4.2 The Judge’s Chambers Suite	56
3.4.3 Ancillary functions	59
3.4.4 Jury Deliberation Suite.....	60
3.4.5 Defendant-in-Custody Courtroom Floor holding Area.....	62
3.5 FUNCTIONAL ZONES AND CIRCULATION SYSTEMS	63
3.6 CONNECTIVITY GRAPHS AND FUNCTIONAL GENOTYPES OF COURTHOUSE BUILDINGS.....	71
3.7 THE GEOMETRIES OF GENOTYPICAL RELATIONSHIPS: FUNCTIONAL DIAGRAMS	78
3.8 GROWTH PATTERNS: FROM THE PLAN OF THE COURTROOM SET TO THE PLAN OF THE COURT BUILDING FLOOR	83
3.9 THE EMERGING SPATIAL STRUCTURE OF THE LINEAR FLOOR PLAN.....	90
3.10 CHAPTER SUMMARY	94
 4 CHAPTER 4: THE DESIGN BRIEF: THE FORMAL LANGUAGE OF RICHARD MEIER.....	 96
4.1 INTRODUCTION	96
4.2 RICHARD MEIER: BIOGRAPHY AND FORMAL LANGUAGE	97
4.2.1 Richard Meier’s Biography	98
4.2.2 The Formal Language of Richard Meier	99
4.3 CASE STUDY: THE BARCELONA MUSEUM OF CONTEMPORARY ART	105

4.3.1	Museum Background.....	106
4.3.2	Building Description and Analysis.....	107
4.3.3	Formal Description and Analysis	117
4.3.4	Concepts that arise from Meier's formal Treatment.....	133
4.3.5	Section Summary.....	136
4.4	TRACING THE DEVELOPMENT IN RICHARD MEIER'S FORMAL LANGUAGE.....	137
4.5	CHAPTER SUMMARY	152
5	CHAPTER FIVE: THE MORPHOLOGICAL ANALYSIS OF THE ISLIP COURTHOUSE BUILDING.....	154
5.1	INTRODUCTION	154
5.2	A FIRST LOOK AT THE ISLIP COURTHOUSE BUILDING	155
5.3	VISUAL AND FORMAL ANALYSIS OF THE ISLIP COURTHOUSE BUILDING	164
5.3.1	Islip: Formal Composition.....	170
5.3.2	The wall as a design theme.....	172
5.4	THE PLAN: THE LINEAR GROWTH MODEL INVESTED WITH ORDER, DIMENSIONAL DISCIPLINE AND PROPORTION.	174
5.5	ELEVATIONS: INTERVALS AND LAYERS.	188
5.6	SYMBOLISM AND MEANING IN THE DESIGN OF THE ISLIP COURTHOUSE BUILDING	195
5.6.1	Islip, Ideal Geometry, and the Temple of Justice	195
5.6.2	The Entrance Rotunda: Meaning and Symbolism	199
5.7	CHAPTER SUMMARY	208
6	CHAPTER 6: CONCLUSIONS	213
	REFERENCES.....	219
	VITA.....	226

LIST OF TABLES

TABLE 3-1 AREAS OF DIFFERENT TYPES OF COURTROOMS AS GIVEN BY THE U.S. DESIGN GUIDE (1997).....	56
TABLE 3-2 AREAS IN NSF OF DIFFERENT FUNCTIONS LOCATED WITHIN THE JUDGE'S CHAMBER (SOURCE: U.S. COURTS DESIGN GUIDE).....	59
TABLE 3-3 THE GENERIC FUNCTIONS THAT ARE DIRECTLY ASSOCIATED WITH FUNCTIONING OF THE COURTROOM DISTRIBUTED INTO THE FOUR ZONES.....	64
TABLE 3-4 RANK ORDER OF INTEGRATION OF SPACES IN SAMPLE OF COURT BUILDINGS.....	77

LIST OF FIGURES

FIGURE 2-1 A MODEL OF THE DESIGN PROCESS AS A PROGRESSION FROM TO SEMANTIC HUMAN INTENTION TO A DESCRIPTION OF AN ARTIFACT AIMED AT ACHIEVING THE HUMAN PURPOSE.....	25
FIGURE 3-1 EXAMPLES OF CONTEMPORARY FEDERAL COURTHOUSE DESIGNS: A) USA COURTHOUSE, LOS ANGELES, CA B) USA COURTHOUSE, EI PASO, TX C) USA COURTHOUSE, AUSTIN, TX D) USA COURTHOUSE, BUFFALO, NY E) USA COURTHOUSE, MOBILE, ALABAMA. (SOURCE: CENTER FOR ARCHITECTURE, NY, 2004).....	47
FIGURE 3-2 COURTHOUSE FUNCTIONS AS DEFINED BY THE U.S. DESIGN GUIDE 1997.....	50
FIGURE 3-3 COURTHOUSE FUNCTIONS AS IDENTIFIED BY HARDENBERGH ET. AL. (1998).....	52
FIGURE 3-4 COURTHOUSE FUNCTIONS AS IDENTIFIED BY PHILIPS & CREIBEL (2003).....	53
FIGURE 3-5 THE LEFT ILLUSTRATION SHOWS FUNCTIONAL SEPARATION OF THE COURTROOM WITH VARIOUS ENTRANCES, WHILE THE RIGHT ILLUSTRATION SHOWS A TYPICAL LAYOUT OF REGULAR DISTRICT COURTROOM FROM THE U.S. COURTS DESIGN GUIDE (1997).....	56
FIGURE 3-6 A NON-METRIC DIAGRAM OF THE FUNCTIONS WITHIN A JUDGE'S CHAMBER SUITE. THE SPECIFIC LOCATION OF EACH FUNCTION IS NOT FIXED AND LEFT TO DESIGN CONSIDERATIONS. (SOURCE: AUTHOR'S DRAWINGS BASED ON THE DESIGN GUIDE REQUIREMENTS.....	58
FIGURE 3-7 A NON-METRIC DIAGRAM OF THE FUNCTIONS OF THE JURY DELIBERATION SUITE. (SOURCE: AUTHOR'S ADAPTATION OF HARDENBERG ET. AL. 1998)	61
FIGURE 3-8 A NON-METRIC DIAGRAM OF COURTROOM FLOOR HOLDING AREA. (SOURCE: AUTHOR'S ADAPTATION OF HARDENBERG ET. AL. 1998).....	62
FIGURE 3-9 THE THREE CIRCULATION SYSTEMS IN THE COURTHOUSE BUILDING AS RECOMMENDED BY THE U.S. COURT DESIGN GUIDE (SOURCE: ADOPTED BY AUTHOR FROM THE U.S. DESIGN GUIDE, 1997) ..	65
FIGURE 3-10 THE COURTROOM FUNCTIONAL SET (SOURCE: AUTHOR)	68
FIGURE 3-11 THE COURTROOM FUNCTIONAL SET DIVIDED INTO FUNCTIONAL ACTIVITIES (SOURCE: AUTHOR)	69
FIGURE 3-12 ALTERNATIVE REPRESENTATIONS OF THE COURTROOM FLOOR SET. UPPER REPRESENTATION IS TAKEN FROM THE U.S. DESIGN GUIDE (1997) AND THE LOWER REPRESENTATION IS BY PHILIPS & CREIBEL (2003).	70
FIGURE 3-13 GRAPH A DEPICTS THE RELATIONSHIPS OF CONNECTIVITY BETWEEN COURTROOM SET, CIRCULATION SYSTEMS AND EXTERNAL WORLD AS PRESCRIBED IN THE US COURT DESIGN GUIDE, 1997. GRAPH B DEPICTS THE RELATIONSHIPS OF CONNECTIVITY BETWEEN THE FUNCTIONS ON COURTROOM FLOORS (SOURCE: AUTHOR).....	74
FIGURE 3-14 GRAPHS REPRESENTING CONNECTIVITY RELATIONSHIPS REALIZED IN A SAMPLE OF 25 COURT BUILDINGS (SOURCE: AUTHOR).....	76
FIGURE 3-15 A FUNCTIONAL DIAGRAM OF THE COURTROOM FUNCTIONAL SET (SOURCE: AUTHOR)	79

FIGURE 3-16 DIAGRAMMATIC REPRESENTATIONS OF A SAMPLE OF 25 COURT BUILDING PLANS (SOURCE: AUTHOR).....	81
FIGURE 3-17 DIAGRAMMATIC REPRESENTATIONS OF THE COURTROOM FLOOR SETS OF A SAMPLE OF COURT BUILDINGS (SOURCE: AUTHOR).....	82
FIGURE 3-18 CONNECTIVITY GRAPHS AND ASSOCIATED FUNCTIONAL DIAGRAMS FOR A SAMPLE OF 25 COURT BUILDINGS (SOURCE: AUTHOR).....	83
FIGURE 3-19: CONCENTRIC AND LINEAR PATTERNS OF RECURSION IN THE CONFIGURATION OF COURT BUILDING FLOOR PLANS (SOURCE: AUTHOR).....	85
FIGURE 3-20 DIAGRAM OF THE CONCENTRIC CONFIGURATION OF THE COURTROOM FLOOR (SOURCE: AUTHOR).....	86
FIGURE 3-21 DIAGRAM OF THE LINEAR CONFIGURATION OF THE COURTROOM FLOOR (SOURCE: AUTHOR) ...	87
FIGURE 3-22 SYMMETRIC OPERATIONS THAT GENERATE COURTROOM FLOOR PLANS FROM THE COURTROOM SET (SOURCE: AUTHOR)	88
FIGURE 3-23 POSSIBLE FLOOR PLANS BASED ON SYMMETRY TRANSFORMATIONS APPLIED TO AN ELEMENTARY COURT SET (SOURCE: AUTHOR).....	89
FIGURE 3-24 REPRESENTATIONS OF THE EMERGENT CIRCULATION STRUCTURE OF THE LINEAR PLAN (SOURCE: AUTHOR).....	90
FIGURE 3-25 ANALYSIS OF THE AXIAL LINE MAPS OF LINEAR COURT BUILDING CONFIGURATIONS. THE UPPER ROW IS COLORED ACCORDING TO CONNECTIVITY VALUES AND THE LOWER ROW ACCORDING TO INTEGRATION. THE SPECTRUM FROM BLUE TO RED CORRESPONDS TO THE SPECTRUM FROM LESSER TO GREATER VALUES (SOURCE: AUTHOR)	92
FIGURE 3-26 VISIBILITY ANALYSIS OF THE PUBLIC SPACE IN LINEAR COURTHOUSE BUILDINGS (SOURCE: AUTHOR).....	93
FIGURE 4-1 THE JUXTAPOSITION OF FORMS OVER LAYERED AND SHIFTED GRIDS AS IN THE DESIGN OF THE ATHENEUM (1979) (SOURCE: FRAMPTON, 2002).....	100
FIGURE 4-2 THE SPINAL WALL THEME REOCCURRING IN THE JEAN ARP MUSEUM I (UPPER PLAN), AND BIBLIOTHÈQUE DE FRANCE COMPETITION (SOURCE: FRAMPTON, 2002).....	103
FIGURE 4-3 THE TRANSVERSE ENTRANCE WALL AS IT APPEARS IN THE BARCELONA MUSEUM OF CONTEMPORARY ART. (SOURCE: RICHARD MEIER'S OFFICE)	103
FIGURE 4-4 FORMAL JUXTAPOSITION AS DEMONSTRATED IN MEIER'S DIFFERENT BUILDINGS: THE JEAN ARP MUSEUM IN THE UPPER LEFT, THE ROYAL DUTCH WATERMILLS HEADQUARTERS IN UPPER RIGHT, THE HYPOLUX BANK ON THE LOWER LEFT, AND THE BARCELONA MUSEUM IN LOWER RIGHT. (SOURCE: FRAMPTON, 2002)	104
FIGURE 4-5 ARTICULATION OF PROJECTED FORMS AS IT APPEARS IN THE ENTRANCE TO THE HYPOLUX BANK ON THE LEFT AND THE ENTRANCE ROTUNDA OF THE BARCELONA MUSEUM TO THE RIGHT. (SOURCE: FRAMPTON, 2002)	104
FIGURE 4-6 AERIAL VIEW OF THE MUSEUM (SOURCE: GOOGLE EARTH)	108
FIGURE 4-7 THE PLAZA AROUND THE MUSEUM WITH THE <i>PASEO</i> CUTTING THROUGH THE MUSEUM'S BLOCK (SOURCE: RICHARD MEIER'S OFFICE).....	109

FIGURE 4-8 MUSEUM ISOMETRIC SHOWING THE PLAZA, RAISED PLINTH, AND PASEO (SOURCE: RICHARD MEIER'S OFFICE).....	109
FIGURE 4-9 FRONTAL VIEW OF THE SOUTHERN FACADE SHOWING THE ARRAY OF FORMS ANIMATING THE FAÇADE (SOURCE: FRAMPTON, 2002).....	110
FIGURE 4-10 THE ANIMATED PLANE HOVERING OVER THE MAIN ENTRANCE (SOURCE: MEIER, 1997).....	111
FIGURE 4-11 GROUND FLOOR PLAN SHOWING THE TRANSVERSE WALL LEADING TO THE ENTRANCE ROTUNDA. (SOURCE: RICHARD MEIER'S OFFICE)	112
FIGURE 4-12 THE CURVILINEAR MARBLE INFORMATION COUNTER IN THE ENTRANCE LOBBY. (SOURCE: FRAMPTON, 2002)	112
FIGURE 4-13 THE GLAZED RAMP-HALL WITH GREEN GLASS, GRIDDED MULLIONS, AND SUN BREAKERS (SOURCE: HTTP://WWW.ARCHINFORM.NET/PROJEKTE/2694.HTM?ID=FB5EE752A0DC68A124C93BC6C43C4627	113
FIGURE 4-14 FIRST FLOOR PLAN SHOWING THE SERVICE BAY, THE 5 BAY GALLERY SPACES IN THE EASTERN WING, THE 'POTATO-LIKE' GALLERY, AND THE 'ODDLY-SHAPED' GALLERIES IN THE WEST WING. (SOURCE: RICHARD MEIER'S OFFICE)	115
FIGURE 4-15 A TRANSVERSE SECTION THROUGH THE MAIN GALLERY SPACES SHOWING THE RAMP HALL, CORRIDORS, AND SKYLIGHT OVER THE THIRD FLOOR GALLERY SPACE. (SOURCE: RICHARD MEIER'S OFFICE)	116
FIGURE 4-16 THE NORTHERN FACADE WITH THE ENTRANCE ROTUNDA SANDWICHED BETWEEN THE TWO WINGS OF THE MUSEUM. (SOURCE: MEIER, 1997).....	117
FIGURE 4-17 THE ENTRANCE ROTUNDA: A: THE ARTICULATION OF THE ENTRANCE ROTUNDA, B: THE WHITE STUCCO OF THE ROTUNDA VERSUS THE ENAMEL PANELS OF THE WINGS. (SOURCE: MEIER, 1997)	117
FIGURE 4-18 THE MUSEUM AS AN ANIMATED WALL DEFINING THE PLAZA (SOURCE: RICHARD MEIER'S OFFICE)	118
FIGURE 4-19 THE PLANAR ELEMENTS DEFINING THE MAJOR ZONES OF THE PLAN (SOURCE: MEIER, 1997) ..	119
FIGURE 4-20 THE WALL ACTS AS A DATUM LINE THAT HOLDS DIFFERENT 'OBJECTS' OR FORMS TOGETHER. (SOURCE: MEIER, 1997)	120
FIGURE 4-21 THE ROTUNDA BETWEEN THE TWO WINGS OF THE MUSEUM. (SOURCE: MEIER, 1997)	121
FIGURE 4-22 THE OVERALL LAYOUT OF THE MUSEUM WITHIN TWO NINE-SQUARE SQUARES AS PRESENTED BY MEIER. (SOURCE: MEIER, 1997)	123
FIGURE 4-23 THE 24 FT. MODULE REGULATING THE STRUCTURAL CENTERLINES OF THE MUSEUM (SOURCE: AUTHOR)	124
FIGURE 4-24 THE MODULE THAT PASSES THROUGH THE RECTANGULAR COLUMNS HAS ALSO A 24 FT. INTERVAL BUT SHIFTED FROM THE STRUCTURAL MODULE BY 9 FT. (SOURCE: AUTHOR)	124
FIGURE 4-25 THE SITE PLAN OF THE MUSEUM WHERE THE UNDERLYING MODULES REGULATING THE DESIGN OF THE MUSEUM ARE EXPRESSED IN THE PAVING AND THE PROJECTED STRUCTURAL BEAMS. (SOURCE: MEIER, 1997).....	125

FIGURE 4-26 THE BASIC 3 FT. MODULE THAT REGULATES THE PLAN OF THE MUSEUM (SOURCE: AUTHOR) ..	126
FIGURE 4-27 THE MODULE PERPENDICULAR TO THE Y-AXIS (SOURCE: AUTHOR)	127
FIGURE 4-28 MEIER USED THE PROPORTION OF $1:\sqrt{2}$ TO LOCATE THE OUTER WALL OF THE MUSEUM AND ACCORDINGLY CENTERLINE F (SOURCE: AUTHOR)	128
FIGURE 4-29 THE GEOMETRIES AND PROPORTIONAL SYSTEMS REGULATING AND ORGANIZING THE LAYOUT OF THE MUSEUM (SOURCE: AUTHOR)	129
FIGURE 4-30 SOUTHERN ELEVATION ON TOP AND THE NORTHERN ELEVATION EXPRESSING THE MODULARITY OF THE LAYOUT OF THE MUSEUM (SOURCE: MEIER, 1997)	130
FIGURE 4-31 THE PLANAR ELEMENTS DEFINING THE DIFFERENT LAYERS OF THE MUSEUM (SOURCE: MEIER, 1997)	132
FIGURE 4-32 SIDE ELEVATIONS DEMONSTRATING THE LAYERING OF DIFFERENT ZONES A: THE EAST ELEVATION B: THE WEST ELEVATION. (SOURCE: MEIER, 1997)	132
FIGURE 4-33 THE SMITH HOUSE (1967) (SOURCE: FRAMPTON, 2002)	138
FIGURE 4-34 DIAGRAMS PRESENTED BY MEIER ELABORATING ON THE STRUCTURE AND ORGANIZATION OF THE SMITH HOUSE (SOURCE: FRAMPTON, 2002)	140
FIGURE 4-35 THE HOFFMAN HOUSE (LEFT) AND THE SALZMAN HOUSE (RIGHT) (SOURCE: FRAMPTON, 2002)	140
FIGURE 4-36 THE BRONX CENTER (SOURCE: FRAMPTON, 2002)	142
FIGURE 4-37 THE ATHENEUM WAS ONE OF MEIER'S FIRST PROJECTS TO UTILIZE THE SHIFTING GRIDS, MODULARITY, AND THE CLADDING WITH THE WHITE PORCELAIN-STEEL PANELS (SOURCE: FRAMPTON, 2002)	143
FIGURE 4-38 THE MUSEUM OF DECORATIVE ART, FRANKFURT (SOURCE: FRAMPTON, 2002)	144
FIGURE 4-39 THE HIGH ART MUSEUM IN ATLANTA. THE MUSEUM EXPRESSES MANY OF THE CHARACTERISTICS OF MEIER'S FORMAL LANGUAGE: THE RAMPED APPROACH (UPPER LEFT); THE RAMP AS THE MAIN CIRCULATION ELEMENT (UPPER RIGHT); THE REGULATING GRID (LOWER LEFT); AND THE WHITE CLADDING PANELS (LOWER RIGHT). (SOURCE: FRAMPTON, 2002)	145
FIGURE 5-1 ISLIP COURTHOUSE BUILDING, NY. (SOURCE: FRAMPTON, 2002)	156
FIGURE 5-2 DETAILED SITE PLAN OF THE ISLIP COURTHOUSE BUILDING (SOURCE: <i>COURTSWEB</i> , 2004)	157
FIGURE 5-3 THE ISLIP COURTHOUSE BUILDING AS APPROACHED FROM THE PUBLIC CAR PARKING AREA. (SOURCE: <i>COURTSWEB</i> , 2004)	158
FIGURE 5-4 ISLIP ENTRY FLOOR PLAN SHOWING APPROACH AND SITE LANDSCAPING (SOURCE: FRAMPTON, 2002)	158
FIGURE 5-5 THE PICTURE ON THE LEFT SHOWS THE ENTRANCE ROTUNDA IN FRONT OF THE MAIN BODY OF THE COURTHOUSE (SOURCE: <i>COURTSWEB</i> , 2004), WHILE THE PICTURE ON THE RIGHT SHOWS THE MAIN ENTRANCE TO THE BUILDING WITH THE PROJECTING CANOPY. (SOURCE: FRAMPTON, 2002)	159
FIGURE 5-6 SKYLIGHT OVER THE ENTRANCE ROTUNDA. (SOURCE: <i>COURTSWEB</i> , 2004)	159

FIGURE 5-7 THE MAIN ATRIUM SHOWING PRIVATE CIRCULATION BRIDGES ON THE 9 TH FLOOR. (SOURCE: <i>ARCHITECTURE</i> , 2001)	160
FIGURE 5-8 A TYPICAL COURTROOM FLOOR IN ISLIP: THE COURTROOM ZONE IS SANDWICHED BETWEEN THE JUDGES' CHAMBERS ON THE NORTHERN FACADE AND THE PUBLIC ZONE ON THE SOUTHERN FAÇADE. (SOURCE: REDRAWN BY AUTHOR FROM <i>COURTSWEB</i> , 2004)	161
FIGURE 5-9 PUBLIC CORRIDORS OVERLOOKING THE ATLANTIC WITH SHADOW PATTERNED ON THE FLOOR. (SOURCE: <i>ARCHITECTURE</i> , 2001)	162
FIGURE 5-10 THE SOUTHERN FAÇADE WITH THE ENTRANCE ROTUNDA AND THE EXPANSIVE SLIGHTLY BOWED BRISE-SOLEIL PLAYED AGAINST THE TOWERING GRANITE WALL. (SOURCE: REDRAWN BY AUTHOR FROM <i>COURTSWEB</i> , 2004)	162
FIGURE 5-11 NORTH FACADE WITH THE THREE-PART MASSING AND THE SPECIAL PROCEEDING COURTROOM PROJECTED FROM THE MAIN BUILDING. (SOURCE: REDRAWN BY AUTHOR FROM <i>COURTSWEB</i> , 2004) ..	163
FIGURE 5-12 THE SEGMENTED SCHEME OF THE WEST ELEVATION AS SEEN FROM THE PUBLIC PARKING (SOURCE: <i>COURTSWEB</i> , 2004)	164
FIGURE 5-13 THE VERTICAL FUNCTIONAL ORGANIZATION SHOWING SEPARATION OF 'HIGH-VOLUME' FUNCTIONS AND 'LOW-VOLUME' FUNCTIONS (SOURCE: <i>COURTSWEB</i> , 2004)	165
FIGURE 5-14 THE HORIZONTAL FUNCTIONAL ORGANIZATION IN TYPICAL COURTROOM FLOORS AT ISLIP (SOURCE: AUTHOR)	166
FIGURE 5-15 LAYERING OF THE WEST FAÇADE EXPRESSING THE FUNCTIONAL ZONES IN THE PLAN OF THE ISLIP COURTHOUSE BUILDING (SOURCE: AUTHOR)	167
FIGURE 5-16 THE LAYERING OF THE WEST FAÇADE FROM THE CAR PARKING (LEFT). A CLOSER LOOK AT THE FAÇADE TREATMENT SHOWING THE GLASS RECESSES IN-BETWEEN MASSES (MIDDLE). THE EAST FAÇADE WITH LAYERING AS A DESIGN THEME (RIGHT) (SOURCE: <i>COURTSWEB</i> , 2004)	168
FIGURE 5-17 THE CREATION OF A SYNTACTICAL CENTER THROUGH FORMAL MEANS" THE ATRIUM AND THE INTERSECTION OF THE TWO WALLS (SOURCE: AUTHOR)	169
FIGURE 5-18 THE MODEL OF THE ISLIP COURTHOUSE BUILDING SHOWING THE JUXTAPOSITION OF THE ENTRANCE ROTUNDA AGAINST THE MAIN BODY OF THE BUILDING AND SITE PLAN SHOWING THE MASS OF THE SPECIAL PROCEEDING COURTROOM ON THE SOUTH FAÇADE. (SOURCE: MEIER, 1999)	171
FIGURE 5-19 A RECONSTRUCTION OF THE FORMAL COMPOSITION OF THE ISLIP COURTHOUSE BUILDING (SOURCE: AUTHOR)	171
FIGURE 5-20 THE SPINAL WALL AS SEEN FROM DIFFERENT ANGLES OF THE BUILDING. THE EFFECT OF THE TRANSVERSE WALL IS MOST CLEARLY VISIBLE IN THE PLAN DEFINING THE EDGE OF THE ATRIUM AND CONNECTING THE ENTRANCE ROTUNDA TO THE BUILDING (SOURCE: AUTHOR)	173
FIGURE 5-21 A DIAGRAMMATIC REPRESENTATION OF THE TWO WALLS SECTIONING THROUGH THE BUILDING WHERE THE SPINAL WALL FRAMES THE GLAZED PLANE AND THE TRANSVERSE WALL CONNECTS THE ENTRANCE ROTUNDA (SOURCE: AUTHOR)	173
FIGURE 5-22 A RECONSTRUCTION OF THE FUNCTIONAL ARRANGEMENT IN THE ISLIP COURTROOM FLOOR STARTING FROM THE GENERIC LINEAR FUNCTIONAL CONFIGURATION AND ENDING WITH THE PARTICULAR COURTROOM FLOORS (SOURCE: AUTHOR)	175
FIGURE 5-23 THE MODULAR SYSTEM THAT APPEARS TO UNDERLIE THE FUNCTIONAL DISTRIBUTION OF THE ISLIP COURTROOM FLOOR (SOURCE: AUTHOR)	175

FIGURE 5-24 THE 21 FT. MODULE OF THE COURTROOM FLOOR PLAN IN ISLIP. THE THICKER MODULE LINES AT 2 AND 28 MARK THE END OF THE MAIN BUILDING BLOCK (SOURCE: AUTHOR)	176
FIGURE 5-25 THE 3 FT. MODULE SHOWN IN GREY UNDERLIES THE DESIGN OF ISLIP ALONG THE X-AXIS. THE ORANGE LINE REPRESENTS THE MAIN 21 FT. STRUCTURAL MODULE AND THE BLUE LINE REPRESENTS MEGA MODULE OF 63 FT. (SOURCE: AUTHOR)	177
FIGURE 5-26 THE DIVISION OF ISLIP INTO TWO EQUAL SEGMENTS WITH THE TRANSVERSE WALL OFFSET FROM THE CENTERLINE 18 (SOURCE: AUTHOR).....	178
FIGURE 5-27 THE DISCREPANCY BETWEEN THE UNDERLYING MODULE AND THE STRUCTURAL GRID: THE STRUCTURAL LINES IN THE RED DOTTED LINE DO NOT COMPLY WITH THE UNDERLYING MODULE MEIER USED (SOURCE: AUTHOR).....	179
FIGURE 5-28 THE MAIN STRUCTURAL LINES (A, B, C, D) ALONG THE Y-AXIS IN ISLIP (SOURCE: <i>COURTSWEB</i> , 2004).....	180
FIGURE 5-29 THE MAJOR CENTERLINES ALONG THE Y-AXIS (SOURCE: AUTHOR)	181
FIGURE 5-30 THE ALLOCATION OF THE CENTERLINE ALONG THE Y-AXIS: A) CENTERLINE B FORMS AN ALMOST PERFECT SQUARE WITH CENTERLINE A; B) SHOWS THE GOLDEN SECTION RECTANGLE BETWEEN B AND D; C) PROVES THAT THE GOLDEN SECTION PROPORTIONAL SYSTEM WAS USED TO LOCATE CENTERLINE D MARKING THE SPINAL WALL (SOURCE: AUTHOR)	182
FIGURE 5-31 THE ALLOCATION OF CENTERLINE C FROM CENTERLINE D THROUGH THE USE OF THE GOLDEN SECTION PROPORTIONAL SYSTEM (SOURCE: AUTHOR)	182
FIGURE 5-32 THE PROPORTION OF $1:\sqrt{2}$ REGULATING THE DIMENSIONS OF THE DISTRICT COURTROOM (SOURCE: AUTHOR).....	183
FIGURE 5-33 THE CIRCLE AND ITS RELATION TO THE GEOMETRY OF THE LAYOUT: 33A SHOWS THE ALLOCATION OF THE CENTER OF THE CIRCLE TO THE SPINAL WALL: 33B SHOWS THE CALCULATION OF THE RADIUS OF THE CIRCLE (SOURCE: AUTHOR)	184
FIGURE 5-34 THE LOCATION OF THE TRANSVERSE WALL IS DETERMINED THROUGH THE USE OF THE GOLDEN SECTION PROPORTION (SOURCE: AUTHOR).....	185
FIGURE 5-35 THE UNDERLYING MODULARITY AND PROPORTIONAL SYSTEMS OF THE ISLIP COURTHOUSE BUILDING (SOURCE: AUTHOR).....	187
FIGURE 5-36 THE MODULARITY OF THE PLAN REFLECTED IN THE DESIGN OF THE SOUTHERN FAÇADE. A CLOSER LOOK AT THE RELATIONSHIP BETWEEN THE MODULARITY OF THE PLAN AND THE DESIGN FEATURES OF THE SOUTHERN FAÇADE (SOURCE: AUTHOR)	188
FIGURE 5-37 THE 3 FT. MODULE REFLECTED IN THE CLADDING TILES, SMALLER FINS EXPRESSING THE 21 FT. MODULE, AND THE LARGER FINS EXPRESSING THE 63 FT. MODULE WITH THE COURTROOM AND SUPPORTING FUNCTIONS (SOURCE: AUTHOR).....	189
FIGURE 5-38 LAYERING A DESIGN THEME IN THE SOUTHERN FAÇADE: 24A DRAWING OF THE SOUTHERN FAÇADE PLACED ON TOP OF THE SITE PLAN SHOWING THE TWO BOWED FRAMES IN FRONT OF THE SPINAL WALLS 24B SHOWS THE LAYERING OF THE BRISE-SOLEIL HELD BY THE FRAMES ‘HUNG’ AGAINST THE GRANITE WALL WITH THE HORIZONTAL BEAMS INDICATING FLOOR LEVELS: 24C THE OVERLAY OF THE TWO PLANES HOLDING THE BRISE-SOLEIL BECOMES FRAMES SHOWING THE GRANITE WALL BEHIND: 24D THE EASTERN END OF THE SOUTHERN FAÇADE SHOWING HOW LAYERING IS ACCOMPLISHED.	190
FIGURE 5-39 THE MULTIPLICITY OF VERTICAL MODULES THAT ARE OVERLAID THE SOUTHERN ELEVATION: THE DASHED RED LINE INDICATES THE 21 FT. MODULE PASSING THROUGH THE FINS AND THE GLASS	

MULLIONS, THE DASHED BLUE LINE INDICATES THE MODULE OF THE LARGER FINS (63 FT.), AND THE ORANGE LINE INDICATES THE SHIFTED GLASS MULLION MODULES (SOURCE: AUTHOR)	191
FIGURE 5-40 THE NORTHERN ELEVATION FENESTRATED BY HORIZONTAL STRIP WINDOWS (SOURCE: AUTHOR)	192
FIGURE 5-41 THE RHYTHMIC PATTERN UNDERLYING THE DESIGN OF THE NORTHERN FAÇADE (SOURCE: AUTHOR)	193
FIGURE 5-42 BEAMS MARKING THE 21 FT. INTERVAL PROJECTING FROM THE PLAN ARE EXPRESSED IN THE FAÇADE (SOURCE: AUTHOR)	194
FIGURE 5-43 THE ENTRANCE ROTUNDA STANDING AS A SCULPTURAL FIGURE IN-FRONT OF THE COURTHOUSE BUILDING (SOURCE: FRAMPTON, 2002)	199
FIGURE 5-44 MEIER'S USE OF CIRCLES EXTRUDED AS CONES IN HIS DESIGNS: 50A THE LIBRARY OF FRANCE WHERE THE CIRCLE IS THE ENTRANCE HALL 50B: CANAL+ THE CIRCLE AS THE AUDITORIUM. (SOURCE: FRAMPTON, 2002)	200
FIGURE 5-45 MEIER'S USE OF CIRCLES AS ENTRANCE HALLS: 5-45A THE CIRCLE AS A SEPARATE ENTRANCE HALL IN THE HYPOLUX BANK: 5-45B THE CIRCLE AS AN ENTRANCE HALL INTEGRATED WITHIN THE BUILDING IN THE BARCELONA MUSEUM OF CONTEMPORARY ART. (SOURCE: FRAMPTON, 2002).....	201
FIGURE 5-46 MEIER'S EXTRUDED CIRCLES AS ARTICULATED CYLINDERS IN THE HYPOLUX BANK IN A AND THE BARCELONA MUSEUM OF CONTEMPORARY ART IN B, WHILE THE CIRCLE WAS EXTRUDED AS A CONICAL FORM IN THE ISLIP COURTHOUSE BUILDING IN C AND D (SOURCE: FRAMPTON, 2002).....	202
FIGURE 5-47 THE ASSEMBLY AND SECRETARIAT AT CHANDIGARH, LE CORBUSIER 1952 (SOURCE; CURTIS, 1986).....	203
FIGURE 5-48 A SKETCH OF THE ST. PIERRE CHURCH AT FIRMINY-VERT, LE CORBUSIER 1963 (SOURCE: BROOKS, 1984).....	204
FIGURE 5-49 THE VISUAL ANALOGY BETWEEN SKETCHES OF THE CHURCH AT FIRMINY-VERT AND THE ENTRANCE ROTUNDA AT ISLIP (SOURCE FOR FIRMINY: BROOKS, 1984)	206
FIGURE 5-50 ONE OF THE STUDY PLANS OF ST.-PIERRE CHURCH AND ONE OF THE STUDY SECTIONS SHOWING THE SQUARE BASE OF THE CHURCH AND THE CONIC EXTENSION OF THE SANCTUARY (SOURCE: BROOKS, 1984).....	207

SUMMARY

The thesis asks whether the constraints imposed by complex functional programs and associated design guidance limit the ability to deploy design languages with entail their own precise compositional requirements. The Islip Federal Courthouse designed by Richard Meier under the General Services Administration's Design Excellence Program is chosen as a case study for two reasons: First, the functional constraints are explicitly documented, and their effects can be studied through a comparative analysis of recent Courthouses also built under the same GSA program; Second, Meier's language has received much scholarly attention, is well understood, and can be described with rigor. Both the functional requirements or constraints and the compositional principles associated with the design language are described as formal structures. The thesis shows that, in this instance, all functional constraints can be satisfied without compromising the elaboration of the language. Thus, the thesis contributes to our understanding of design logic and supports the idea that design intentions as well as design considerations can be reconstructed through a systematic study of the designed object

1 CHAPTER ONE: INTRODUCTION

1.1 Reflection and Intension in Design

This thesis discusses the interaction of architectural design, as a reflexive activity, and the application of knowledge about buildings. All building, including anonymous building within a tradition, involves the application of knowledge. Architectural design, however, contributes a critical reflection upon such knowledge, versus the direct application of such knowledge in a design situation, even when it does not result in innovation with respect to form or function. In order to understand built form as a result of design, therefore, it is important to distinguish between different kinds of knowledge embedded in the form: adopted knowledge and knowledge brought to the design as a result of reflection. As such, this thesis addresses the question of how the interaction of architectural design and adopted knowledge is manifested in the form of the building.

Knowledge about a building is mainly substantive, to use Faludi's term (1984); it is about the variables involved with building function and building operation rather than procedural, that is dealing with the process of design. In other words, knowledge about a building tells what a building is. This knowledge is usually presented as design desiderata i.e. programmatic design requirements, which have no particular form or syntax, and is usually presented to the designer beforehand in the form of the building program. Design as a reflexive activity follows Schön's (1987, 1990) definition of design as "reflection-in-action", and involves critical reflection upon a design problem through an internalized design process, thus framing it in a different way that goes beyond its immediate conditions and leads to new understanding of the design context and a higher level of creativity. Since in architecture architects manipulate and produce forms i.e. buildings as a response to a design situation, design as a reflexive activity can be seen as a formulation process that involved the exploration of aesthetic aims through the manipulation of form and the evaluation of the design proposals against the design

desiderata (Peponis, 1993). Since designers' response to a design situation is through the built form, or a representation of the projected form, the critical reflection is expressed as a formal language that the designer brings to the design situation. Thus, the above mentioned question can be recast to address how a design program interacts with a formal language of design in a certain building.

To pursue this question, the thesis looks at the Islip Federal Courthouse building designed by Richard Meier (1993-2000). Answering the questions "why courthouse?" and "why Richard Meier" is a good way to approach this introduction. On one hand, as a building type, a courthouse building is strongly constrained by functional and programmatic requirements. More importantly, such requirements, which govern courthouse design, are made explicit in design guidance. Requirements concern not only the nature, size, furnishing and servicing of individual spaces but also their relationships to one another. In turn, the relationships specified in the design guidance do not bear on local patterns of contiguity or connection alone, but also on the overall organization of the plan. For example, courthouse design must respect clear functional zoning principles and clear principles regarding the provision of alternative circulation systems for users of the courthouse to correspond with the zoning. In consequence, the design of a courthouse is highly and explicitly constrained by knowledge about the program and the function accommodated in it. By implication, design freedom is limited and one might expect that courthouse design reflects the application rather than a critical reflection upon relevant social and professional knowledge. On the other hand, for a large portion of the society courthouse buildings have a great symbolic value; they represent justice, fairness, and equality among members of the society. Thus, as Phillips (1999, p.105) states "*so the courts reason for being-to provide places where justice is administered and affirmed-must be architecturally legible.*" Accordingly, the architecture and design of courthouse buildings is richly laden with symbolic values and meaning.

At the same time, courthouse design in the United States has recently become a focus of particular attention as the government, through the General Services Administration and the Design Excellence Program, has sought to enhance the

architectural quality of federal courthouses, through inviting innovative designs, as part of a general aim to elevate the contribution of public buildings to architectural excellence and to the expression of public values. Accordingly, studying the architecture of the courthouse building provides the opportunity not only to ask the question of “how far can architecture be considered a reflexive activity when, in some respects, the building is “pre-designed” by a body of knowledge taken for granted in the design charge?” But more importantly, to ask the question of “what can architecture contribute to the design of the courthouse building and how can it address symbolic notions if the program of the building and its intended programmatic functions i.e. design charge, are indeed so constraining.”

Among the architects that have been involved with courthouse design, why select Richard Meier? Over his four decade career, Richard Meier has been associated with a design language that is clearly recognizable and that has been consistently evolving across a wide range of building types. Meier’s buildings have a clear set of formal characteristics and design themes that can be traced across different projects and building types. Among others, these characteristics include a geometrical order that visible in the modules and proportions applied to the structural grid; the organization of space in his buildings tends to involve a sense of visual layering arising not only from the transparency of the envelop and the arrangement of successive planes across the visual field but also from the juxtaposition of offset or rotated grids; and the assertion of syntactic centrality, the creation of a pivotal space within the building, even though the overall form eschews easy symmetries. Thus, by studying a building by Richard Meier, one can more readily address the question of “how do a building program and its requirements expressed in the design charge interact with a well formed design language that has its own generic principles?

In this thesis, this question will be pursued with a particular emphasis upon the geometrical ordering of building plans and elevations, and the modular and proportional systems entailed in this ordering. This choice of emphasis is not coincidental. While other aspects of Meier’s language may be equally important from the point of view of the

perceptual qualities or the aesthetic judgment of his buildings, geometrical ordering most closely interacts with the functional organization. Thus, by focusing on geometrical ordering, the thesis is focusing on the aspect of the language which is most likely to be affected by the functional and other requirements of the program. If the design of a courthouse satisfies principles of ordering that are found in less constrained buildings the argument that a well formed language can respond even to the elaborate programmatic requirements of courthouse design is supported more strongly and more clearly.

Therefore, studying the interaction between the generic principles of formal organization entailed in the program of a strongly constrained building and the generic principles entailed in a strongly articulated design language seems to be an appropriate way to deal with the broader theoretical question of “what does architectural design, as a reflexive activity, add to building, as an activity that always involves the application of knowledge.”

Even if we succeed in understanding designed form as an interaction between the generic principles governing the program and the generic principles governing a particular design language, the question of architectural intention is not exhausted. To address architectural intention/s, one has to cast another question “what is an architect deploying and questioning a given design language against the requirements of a particular program trying to achieve over and above the constraints of the functional requirements and particularities of the design language.” If we were to take the integrity of the language to be the only aim of the exercise, the design would be reduced to a search for a mapping across two domains: the formal language of Richard Meier in general, and the particular design of the courthouse in particular in the case of this thesis. While the establishment of such a mapping is an intricate analytical task that will much preoccupy the chapters that follow, the mapping in itself cannot be assumed to be the whole aim of design. Rather, it is more likely that an architect deploying a given language has some more specific aims in mind. The language might be the medium in which an architect thinks, but it is not necessarily the thought itself. By seeking to reconstruct design intentionality over and above the deliberate deployment of a design

language in a building, one is also seeking to understand the significance of a certain building as an individual design, rather than merely as a member of a class of similar designs. In short, we question the nature of a design as a potential formulation of intentions and relationships that are of interest but were not known ahead of the design process itself.

If these are the main questions addressed in the thesis, the reader may be assisted by a similar sketch of some of the main findings. The analysis of the Islip Courthouse in New York suggests that at least in the case of Richard Meier the constraints imposed by the program did not limit the deployment of the language. On the contrary, a comparison between Islip and the Museum of Contemporary Art in Barcelona suggests that the language is deployed as fully, if not more elaborately, in the building type which is more constrained by program (the courthouse) than in the building type which is constrained less (the museum). This leads to discussion of what we mean by programmatic and functional constraint when we discuss architectural design. To prefigure the argument, strongly constrained building types may limit the ability of architects to contribute to the evolution or transformation of social function, but they do not necessarily limit their ability to deploy and elaborate specific design languages. Social and formal constraints interact, but are not equivalent. The case studies under investigation lead to clarifications regarding the nature of program and language from the point of view of the generation of form.

These findings, which hold the value of generalizable hypotheses, are complemented by a discussion of whether the individual courthouse design is significant from both the point of view of the client or the design charge and from the point of view of the architect and the intentions specifically expressed in it. It is suggested that in Islip Meier takes an important step towards monumentality and the expression of justice as a higher, almost sacred value. This has to do with the incorporation of figures which originate with the vocabulary of Le Corbusier, commonly thought to provide the formal foundation for the explorations of Richard Meier. Thus, within the evolving corpus of Meier's work Islip may claim some particular significance. Whether this carries over so as to satisfy the

symbolic aims of the design charge is a different question and one largely outside the bounds of the thesis.

1.2 Methodology

In order to address the issues of interaction of generic principles of a formal language and the generic principles of program, along with embed architectural intention/s, one has to look at architectural form since it is through the medium of form architecture receives expression and through that medium it communicates (Baker, 1996). Furthermore, all the other factors that affect the design process manifest themselves in the architectural form (Liou, 1992).

It should be noted that in the case of this thesis, form is extended beyond the common connotation of shape: it refers to Langer's (1967) 'logical form' i.e. the way a designed object is structured or constructed. Logical forms have an underlying structure with specific attributes and relations that result from an intentional design process where intention/s is expressed in the physical attributes of the designed object. In other words, some of the physical properties of the building form could not have risen if there was not an intentional process aims at creating a form that exceeds the requirements of function in most cases. Thus, according to Bafna (2001, p. 8) buildings can be looked at as *"formations with systematic aspects to their structure-the various elements that make up their form are not merely circumstantially brought together, but exist under a systemizing influence"*. Accordingly, it can be argued that through the systematic investigation of the building form, the intention behind the designed object can be, at least partially, recovered from the analysis of designed object itself.

The systematic investigation of form in architecture falls under architectural morphology. Architectural morphology can be defined as the study of the structure or architecture of form through systematic investigation that aims at discovering design

principles and rules underlying architectural forms.¹ Accordingly, through the morphological analysis of the Islip Courthouse building by Richard Meier, this thesis aims at not only studying the interaction between the generic principles of program and the generic principles of formal language in that building, but also reconstructing the evolving intentionality within the building through the analysis of its form.

As mentioned earlier, the case selected for analysis is the Islip Courthouse building designed by Richard Meier (1993-2000), a building described as “*One of the most radical Federal building constructed to date*”² on the National Building Museum website. The courthouse was selected mainly because it is an excellent example of the interaction between a well constrained program and a well formed formal language. The Courthouse was celebrated in numerous architectural magazines e.g. *Architecture* 1996, GA, 1997, *Architecture*, 2001, and furthermore, it received the Design Excellence Award in 2000, and the AIA Award for outstanding architecture in 2003.

To set the ground for the morphological analysis of the Islip, it is *a-priori* to reconstruct the design charge and the design brief of the Islip Courthouse building. Baxandall (1985) used the term design ‘charge’ to refer to the general terms under which the design problem is presented to the designer, or in other words, the design task, while the design brief refers to the specific issues the designer sets him/herself to address in the charge and what he/she brings to design process, thus directing his/her search for an architectural solution. The reconstruction of the design charge of the Islip Courthouse building is carried out through literature review and the analysis of a selected sample of courthouses. The reconstruction of the design charge aims at: first, understanding the general context under which the design of the Islip Courthouse building was commissioned through the revision of the Design Excellence Program and second, the identification of the functional components and programmatic requirements that make the program of the federal courthouse building a highly constrained one. The findings of the literature review will be tested over a sample of selected courtroom floors to see the

¹ This definition is a compiled out of Steadman’s (1983) and Liou’s (1992) definition of morphology.

² <http://www.nbm.org/Ehibitions/past/2001/NY.html>. retrieved on June 21st 2005

effect of the programmatic requirements on the topology and geometry of the functional configuration of the courtroom floors. The reconstruction of the design brief involves the identification of the formal design language of Richard Meier in the period between 1987 and 1996 through literature and document review and the morphological analysis of the Barcelona Museum of Contemporary Art to exemplify how the formal language is deployed in a certain building.

The morphological analysis of the Islip Courthouse building will start by giving the reader an overview of the building and then explore the visual aspect of the building that conform to Meier's formal language. Through the morphological analysis of the building, the thesis will explore the implicit characteristics of Meier's formal language and further investigate how these modular and geometric design themes of Meier interacted with the functional requirements and design constraints of the courthouse as a building type. Furthermore, the thesis will reconstruct the design intentions of the designers as inferred from the verbal description as well the morphological analysis of the building.

1.3 Thesis Outline

The thesis is organized in six chapters that run as follows: chapter one starts with an overview of the thesis stating the main questions, and the methodology that will be pursued in the thesis.

Chapter 2 states and discusses more fully the questions addressed in the thesis and constructs the conceptual framework within which these questions are explored. It is a largely a theoretical chapter which situates the thesis in a broader field of literature about the nature of design and design knowledge.

Chapter 3 offers a reconstruction of the design charge or problem situation that underlies the design of Islip Courthouse building. The problem is initially reconstructed based on the on a review of the Design Excellence Program, and the review of the Federal Courthouse design program of the GSA, and the relevant documents of design

guidance. In order to further clarify the constraints that govern courthouse design; the chapter also compares a sample of recent courthouse buildings so as to identify their invariable properties as an index of design constraints. Islip is shown to conform to widely spread underlying principles, as far as the functional organization of space is concerned.

Chapter 4 discusses Meier's design language as exemplified in the building for Barcelona Museum of Contemporary Art. It subsequently traces the evolution of some of the design themes identified through the analysis of Barcelona Museum of Contemporary Art in some of Meier's well known previous buildings. The aim is to underscore the generality of some of Meier's design principles to complement the more elaborate account of how these principles are realized in one building.

Chapter 5 reconstructs the design of Islip in detail. It demonstrates the precise manner in which its form comes to organize and express its function. It also shows exactly what the principles of order imposed upon the form according to the exigencies of the design language are. The chapter concludes with the formulation of the idea of justice as a higher value within the context of Meier's design language as it relates to the notions of ideal geometry and the inheritance of Le Corbusier and his design for a church at Firminy more particularly.

Chapter 6 concludes the thesis. The conclusions include the contributions of this thesis in terms as a methodological approach studying the interaction between program and language, defining the characteristics of the courthouse program in terms of connectivity, integration, and formal structure, defining the characteristics of Meier's formal language, and enhancing our understanding of how architectural intention become embedded within the formal structure of a building through the interaction between a strong program and design language.

2 CHAPTER TWO: THEORETICAL FRAMEWORK

2.1 Introduction

This chapter sets the theoretical framework of the thesis leading to three interrelated questions: First, “how do the generic principles of a design program interact with the generic principles of a design language in the context of design formulation”? Second, “how are architectural intentions embedded in the form of the building?” Third, “what does architecture add to building?” Accordingly, the chapter is divided into several sections: section one sets the framework for understanding buildings in terms of space organization reflecting a program and also as logical forms. Thus, it prepares the ground for introducing Baxandall’s (1985) distinction between design charge and design brief. Section two will discuss the question of what does architecture add to building in terms of the interaction of the design brief and the design charge or the ‘what’ and ‘how’ of design. Section three will present the understanding of design as formulation: it will suggest that the generic principles of the design charge and the generic principles of a formal language interact with the emergent qualities of the designed object to produce the final form of the building and to inscribe the designer’s intentions in it.

2.2 Understanding Buildings: Building as Logical Forms and Buildings as Spatial Organizations

Describing buildings is not an easy task; buildings can be described according to the context in which they operate, according to their features and properties as designed artifacts, and/or according to the function they have to perform. One way of looking at buildings is as a system of complex material construction composed of a physical structure, a system of spaces arranged by the physical structure, and a spatial experience engendered by the previous two systems (Peponis, Karadima & Bafna, 2003). The nature of the material or construction system from a technological point of view is not of interest

to this thesis; rather, this thesis focuses on the system of spaces arranged by the physical structure, which houses the different functional activities intended for a building, and the conceptual or abstract structures that lie beyond the material construction of many buildings, which govern the arrangement of the physical structures and give rise to their formal properties. These structures might be implicit hidden within the physical structure of the building or might be explicitly demonstrated through the formal properties of the building. As such, describing and understanding buildings requires more than the sensuous description of them, it requires an understanding of their spatial and formal structures.

2.2.1 Building Programs as Spatial Organizations

Hillier, Hanson & Peponis (1984) defined buildings as cultural artifacts that can be regarded as physical constructions, spatial arrangements, and objects in a particular style. In other words, through their physical arrangement, buildings organize space for various purposes and transmit social meaning through their physical form. The same point was noted by Rapoport in earlier publications (1976, 1979) where buildings, as part of the built environment, are considered as a series of orderly spatial relationships between elements and people where these spatial relationships “*reflect and facilitate relations and transactions between people and the physical elements of the world.*” (Rapoport, 1976, p. 9). Through its design, the built environment organizes space for different purposes according to various rules that reflect the needs and values of different groups and individuals, thus reflecting and representing congruence between social and physical space; the built environment also organizes meaning through forms, and detailing; it organizes time; and, finally, it organizes communication through its configuration that controls patterns of movement and encounter.

Thus, it can be inferred that the one of the functions of a building is the organization of space through the building’s formal configuration. This spatial organization serves many purposes, among which is the accommodation of an institution. According to Markus (1987) for any building to function effectively i.e. accommodate

the function/s required by the institution occupying the space of the building, the building has to organize people, objects, and activities into meaningful relationships in space. Hence, one can conclude that the organization of people, objects, activities, and their meaningful relationships in space is of a primary importance in any building type. This raises the question of how space is organized inside a building.

By designating a projected building to house a certain institution, the building is given a label i.e. courthouse, that defines it as a functional type. The functional building type defines what Hill (1999) called a “programmatic whole”, an abstract notion referring to the global function of the building or what will the building be used for. The importance of identifying the functional type lies in the identification of the components activities and pragmatic functions that make up the global function or the programmatic whole. These component functions operationalize the global function i.e. make possible the execution of the “programmatic whole” on a practical and empirical level by taking place separately or simultaneously within spaces inside the building. Thus, the overall space of the building is divided into subspaces where the pragmatic functions are mapped onto. Hill (1999) referred to the pragmatic functions as “ensembles of use”. These ensembles include three components: a human activity i.e. a function, apparatus or equipment necessary for the execution of the activity, and a configured space where the activity takes place.

The spatial division of the space inside a building is not ad-hoc; Markus (1987) argued that many buildings have explicit rules about how people, objects and activities are disposed in space so that the spatial embodiment of these dispositions represents the particular practices or knowledge in a certain field, which insures proper functioning of the institution or building. In other words, there are rules of ‘what’ activity takes place ‘where’ by ‘whom’ and under what conditions. Furthermore, these rules specify ‘who’ communicates with ‘whom’³ and ‘where’. Accordingly, spaces housing functions inside the building are arranged in functional zones and spatial relations according to the rules

³ Hillier, Hanson, and Peponis (1984) divided users of a building into two categories: inhabitants who have a degree of control over spaces in the building and visitors who have the right to be in the building but do not have control rights over spaces in the building.

that govern the functioning of the institution. As such, the spatial organization of the building represents the mapping of how an institution⁴ inhabiting the building works or functions into space, and more importantly, through the spatial organization of the building the social entity materializes and operates.

Because projected buildings do not exist in reality, means are needed to describe these future buildings to designers and architects. Building programs are the means through which building sponsors or owners describe and/or prescribe their future buildings to designers, and communicate them to users and other stake holders in the projected building. Of course, while building programs make the functional requirements associated with a programmatic whole explicit, they may not necessarily be sufficient descriptors of these requirements. They are naturally complemented by the tacit knowledge that arises from having been exposed to other buildings of the same function-type. Which is why, in the next chapter, the description of program will be partly based on an analysis of texts and partly on an analysis of other similar buildings.

One might be inclined to ask the question of what is the importance of a building program to this thesis. The answer is quite simple; the aim of a building program is to *“create linguistic classifications of objects, people, and activities such that the space of the building ultimately becomes an embodiment of these classification systems.”* (Markus, 1987, p. 467). Thus, the program is the verbal manifestation of the building as spatial organization; it represents the knowledge about the building the designer has to attend to in his design. Accordingly, it can be argued that the building program is ‘what’ the designer has to address and it is given to him/her before the initiation of the design process.

It is of importance to this thesis to distinguish between two types of building programs: a strong or well-constrained building program, and a weak building program. The term strong program was coined by Hillier, Hanson & Peponis (1984) in their

⁴ In *Space is the machine*, Hillier (1996) distinguished between the architectural program of a building and the organization it houses; the program refers to those aspects of the organization that have a spatial dimension i.e. can be mapped into/from a spatial configuration.

discussion about building function. They defined a building with a strong program as a building where everything that occurs is specified by social, organizational and institutional rules which are themselves inscribed in the spatial layout. In strong program buildings, the function of the layout is to control what happens so that prescribed activities are supported while un-prescribed ones eliminated or hindered. A weak building program is one where much of what takes place is not specified by rules and can arise as a by-product of the way in which people move and occupy space. In strong program buildings, the spatial structure of the layout tends to be compartmentalized into function specific ensembles of use; by contrast, in weak program buildings possible behaviors are supported by the layout as a whole, because they are not restricted to functionally compartmentalized zones or areas.

In *Space is the Machine* (1996), Hillier elaborated more on the concept of ‘strong program building’. In his attempt, Hillier referred to the program as the spatial dimension of the organization to be housed in the building. The key element in the program is ‘interface’⁵ where interface is spatial relation between ‘inhabitants i.e. people who have a degree of control over a space, and visitors i.e. those who have less control over space and whose existence in the building is temporal. Buildings create interfaces where inhabitants and visitors can meet so that the organization can function. Hillier defined a building as a strong program building when the interfaces constructed by the building have a ‘long model’ i.e. there are strong rules that specify relationships between the different interfaces within the building to the extent that the form generation process has too many restrictions,⁶ accordingly, a limited number of forms or morphological potential can be generated.

In a ‘short model’ there are few restrictions i.e. relationships specified by rules on a random form generation process allowing the generation of varied morphological

⁵ Hillier, Hanson, and Peponis (1984) defined buildings as devices that create two kind of interfaces between different categories of inhabitants and inhabitants and visitors through their spatial configuration and degree of integration and control. They further elaborated that these interfaces are referred to as the global function of the building.

⁶ The aim of these restrictions is to structure the interfaces that must occur and inhabit all others according to the culture of the organization.

potential. Thus, buildings with a short model are labeled ‘weak program’ buildings where interfaces are less structured and accordingly allowing random movement and loosely controlled encounters. As such the weak program offers very little in terms of the way functions are spatially arranged inside the building, and accordingly, does not offer limitations or suggestions for the future form of the building.

The concept of a ‘strong program’ is integral to the argument of this research, because of the restrictions such a program imposes on the design i.e. both functional and formal structure of the layout, of a projected building. These restrictions are not only manifested in the provision of function-specific labels for spaces i.e. courtroom, specifying the primary function of a space,⁷ but more importantly, to how these are set in particular patterns of relationships in a building i.e. the specification of the spatial relations that have to be maintained between these spaces to sustain required functional or social relationships necessary for the functioning of the institution housed within the space of the building. Therefore, the program also defines functional zones i.e. how different functions are grouped or clustered together and their relation to each other through proximity and adjacency,⁸ accessibility, movement, and circulation paths that link different spatial components and functional zones together. Thus, the program defines ‘who’ is allowed to go ‘where’ and through ‘what path’ in order to interact with ‘whom’. The verbal categorization has to be maintained in the spatial structure of the building.

Courthouse buildings are considered to be strong program buildings because of the explicit programmatic requirements regarding functional zoning and circulation systems as will be shown in chapter three. As such, the program imposes limitation on

⁷ Labeling the space i.e. assigning a function to them, defines categories of activities and behaviors that are acceptable in them as well as the sanctions and social conventions that apply to the use of the space (Peponis, 2001). Furthermore, the labeling of a space defines the minimum dimensions required, anthropometric information i.e. spatial planning; equipments necessary for the performance of the activity such as furniture and apparatus, size and dimension of equipment, required technology etc...; and information regarding the physical as well as the psychological climate under which the activity takes place such as temperature, illumination, etc...

⁸ It should be noted that the spatial components and functional zones are not necessarily a direct translation of the organizational structure of the institution; it rather represents the specialization of different activities and their relationships in order to insure the effective functioning of the organization.

the final form of the building. Accordingly, courthouse buildings present a good case study to investigate how the generic programmatic principles interact with the generic principles of form to produce the final form of the building.

2.2.2 Buildings as Logical Forms: the Formal Language of Design

Buildings organize space through their material structure. As material structures, buildings have formal attributes i.e. the physical variables such as design elements, architectonic forms, architectural vocabulary, etc... These formal attributes or properties are not only material constructions but they also have a cognitive, conceptual, and affective dimension to them (Peponis, 2005). These conceptual attributes can be looked at as logical forms.

The concept of logical form was coined by Langer (1967) in her book *An Introduction to Symbolic Logic*. Langer noted that in order to understand the different forms and relate them to each other, one needs to know them and that knowledge is not knowledge *of* things in the most direct and sensuous way, but rather knowledge *about* things in terms of knowing what sort of things they are; how they are made up; and what their internal relations are. In order to know about a thing, one must know the particular form it is taking in a particular case (instance). Nevertheless, Langer noted that to have knowledge *about* an object, one has to understand its form, but the understanding of ‘*form*’ should be stretched beyond the common connotation of geometric or physical ‘*shape*’. In her definition, anything can be said to have a form if it follows a *pattern* of any sort, exhibits order, and internal connection. To distinguish the abstract principles of form from shape or physical form, Langer coined the term “*logical form*”

Thus, the “*logical form*” of a thing is the way that thing is *constructed*, the way it is *put together* or *structured*. Thus, a building has a logical form when it has a *structure*. Nevertheless, one must not only associate “*structure*” only with the material construction of something i.e. the deliberate assembly of something out of parts that were previously separate, but more importantly, with how it was structured and put together conceptually

i.e. its underlying system of ordering. In other words, the *structure* of a building is “*the schema that provides the underlying order and structure for an aspect of an architectural design.*” (Akin, 2002, p. 410).

Therefore, the logical form of a building refers the abstract logic underlying and organizing its physical structure. The importance of logical form lies in its ability to explain how the formal properties of a building arise from the relational properties of the different parts of the building within an overall structure as stated by Peponis (2005).

The reader might be inclined here to ask the question of what is the importance of the logical form of a building for this thesis. The answer to this question is two fold: the first was provided by March (1976) in his book *Architecture of Form*. In that book, March did not use the term *logical form*; instead he used the term *built form*. He separated built form from buildings, which are complex artifacts, and used built form to refer to a conceptual model, either mathematic, quasi-mathematical, or diagrammatic that can be used to represent a building in any required degree of complexity in theoretical studies. These logical forms can be generated as abstract representation for a building or a class of buildings and be used in analytical studies to: study the conceptual aspects of a certain class of buildings; explain the underlying order of existing buildings; and further make general statements about several buildings on the basis of a few defined aspects (Rashid, 1998). The second lies in the fact that logical form of a building represents how the designer/s conceptually organized the material construction, accordingly subdividing the space of the building into a spatial pattern that responds to the requirements of the program, and generated the formal properties of the building. Furthermore, it not only represents ‘how’ the designer/s responded to the design task or ‘what’ the designer was given by the client manifested in physical and logical form of the building but also what the designer added to the design task that was not required by the design program.

Since forms are what architects manipulate in order to express their design ideas, and since the formal structure reflects the logical form of the building, it is consistent to use the term formal language to refer to how designers express their design ideas in

architecture. The term language is used here not to mean that architecture is the same as language but it is analogous to a language i.e. it has something in common with a language. This commonality is two folds: the first is where architecture through design mediates between things apart from its materiality e.g. communicate meaning among other things, just like language, and the second is that architecture can be related to the syntactic aspects of a language with its structural and grammatical rules (Forty 2000).

This view is not a new one: for instance, Sebastiano Serlio in a series of books published between 1537 and 1575 treated architectural expression as a matter of language, and proposed that the treatment of different architectural elements, assembled according syntax, would evoke the use of the building. Voillet Le Duc (Cited in Knight, 1994, p. 24) called for a language for design:

“Let us now return to design. The first step in design is to know what we wish to do. To know what we wish to do is to have an idea; to express that idea; we require principles of form, that is to say, rules and a language.”

In technical terms, architectural formal languages can be characterized by a vocabulary and a grammar. The vocabulary is made up of a distinct set of elements, while the grammar is made up of a collection of rules that embody the compositional principles or conventions that govern how the elements can be placed in space (Durand, 1802; Eisenman, 1963; Flemming, 1990; Tzonis & Lefaivre, 1986; Knight 1994). Accordingly buildings can be described as a set of as sets of design elements, either elementary or combined into components and shapes, placed in deliberate geometrical relationships i.e. they have an underlying formal logic, that are governed by compositional principles.

Thus, it can be concluded that any building has two aspects to its design: a real and pragmatic aspect that deals with the organization of its internal space that houses activities related to the functioning of the institution inhabiting that building, and an abstract, conceptual aspect that deals with the logical form of the building that governs and organizes its material construction, which is expressed in the formal language of

design. The real and pragmatic aspect of the design is ‘what’ the designer is given beforehand in terms of program and site, while the formal language of the building expresses ‘how’ the designer addressed the design situation; the designer’s response and addition to the design task. To elaborate more on the difference between what the designer is given and how he/she responded to the design task, the thesis will use Baxandall’s design charge and design brief.

In his book *Patterns of Intention*, Baxandall (1985) used the term design charge to refer to the general terms and conditions under which the design problem is presented to the designer or the design task. Following Baxandall, Bafna (2001), in his dissertation, used the design charge as what the designer is given as a design task. Peponis & Wineman (2002, p.280) used the term design charge to describe *‘the programs, requirements, and known solution types that specify what is expected of design before design begins...charge refers to the aims of design that are known in advance, independent of the designed object.’* In that sense, the design charge is synonymous with what Faludi (1984) defined as substantive knowledge i.e. knowledge concerned with the variables of the building providing all necessary information concerning the design problem and its context. In this thesis, the term design charge will be used along the same line to refer ‘what’ the designer has to address in terms of the design program or programmatic design requirements i.e. design desiderata, within the context of a design problem.

Baxandall used the term ‘design brief’ to refer to the specific issues the designer sets himself to address in the charge, thus directing his/her search for an architectural solution. Peponis & Wineman (2002, p. 280) used the term brief to describe *“the additional aims, or inflections of aims brought about by designers themselves in the course of design...brief refers to the aims of design as intrinsic to the designed object and can not be initiated before the design process itself.”* As such, the design brief refers to how the designer addressed the design task including what he/she added to the design task during the design process. Thus, the charge addresses ‘what’ was intended and the brief addresses ‘how’ the intended object took the form that it did.

In the next section, the thesis will elaborate how within the interaction of the design charge and the design brief, design takes building from the mere application of knowledge to become architecture.

2.3 The ‘what’ and ‘how’ of Design: from Building to Architecture

In his book *Space is the Machine* Hillier (1996) stated that to distinguish between building and architecture is not to ask the question of what is the difference between architecture and building; but rather to ask the question of what architecture adds to building. For most architectural theories, architecture adds aesthetics to building; Nikolaus Pevsner (1945) in the opening paragraph of his *Outline to European Architecture* stated the distinction between architecture and mere building is carried out through aesthetics where the term architecture applies only to buildings designed with a view to aesthetic appeal. For Krier (1988, p. 10) “*a building can only be raised to the status of architecture through the additional fulfillment of aesthetic requirements*”. Thus, both distinguished writers assumed that the status of architecture can be reached through the addition of an aesthetic appeal to the building.

In *Space is the Machine*, Hillier went beyond the aesthetic appeal to explain what architecture adds to building. Hillier (1996, p. 21) defined a building as “*the construction of physical elements or materials into a more or less stable form, as a result of which a space is created which is distinct from the ambient space.*” This construction is a purposeful objects i.e. created for a certain purpose or function, which is mainly the housing of human functions. Buildings become more important than their bodily functions by first elaborating spaces into socially workable patterns that generate and constrain patterns of avoidance and encounter, and by elaborating physical forms into patterns through which culturally or aesthetically sanctioned identities are expressed.

In order to elaborate on the production of building and its relation to architecture, Hillier (1996) draws the analogy with language. In language, one can distinguish between

ideas one thinks *of* i.e. words and ‘what’ they represent, and ideas one thinks *with* i.e. the syntactic and semantic rules which govern ‘how’ one deploys words to create meaning.⁹ According to Hillier, buildings as cultural artifacts with spatial and formal configurations represent ‘what we think of’ or ‘what’ designers design i.e. they are the object of design. These ‘ideas to think of’ represent the design charge. They are produced through non-discursive rules; “...*hidden structures that we think with that have the nature of configurational rules in that they tell us how things are to be assembled, and work below the level of conscious.*” (Hillier, 1996, p. 40). These rules represent ‘how’ designers realize their buildings into a built form or a representation of it. They represent the design brief. As long as these rules are non-discursive i.e. unconscious and are not subjected to critical thinking, Hillier labels them ‘social knowledge’, the buildings created by them are considered vernacular buildings. In other words, the logical form of the building is produced by the application of ‘social knowledge’.

Nevertheless, Hillier asserted that the underlying configurational ‘ideas-to-think-with’ give order and purpose to buildings. He further draws on the concept of ‘architectural competence’ to refer to the ‘ideas-to think-with’ or ‘how’ designs are carried out. ‘Architectural competence’ is a concept that Hillier borrowed from Noam Chomsky’s study of language. Architectural competence refers to “*a set of technological, geometrical and manipulative skills relating form to use, which constitute an accounthow a house was thought of...*” (Hillier, 1996, p. 44). This set of skills is referred to by Bafna (2001) as an instrumental set.¹⁰

⁹ This view of design can be allocated within the broader view of formal languages of design mostly linked to linguistics and Noam Chomsky. Researchers that have dealt with formal languages include among others Eisenman (1963) in his dissertation, *The Formal Basis of Modern Architecture*, Knight (1996).

¹⁰ Bafna (2001) refers to the instrumental set as conventions, rules of thumb, and operational procedures through which designers conduct their design operations in order to foresee the final design product before its construction. Thus, the designer thinks *of* a design problem but thinks *with* the instrumental set. As long as this instrumental set is on the level of unconsciousness, Bafna (2001) refers to it as tactics i.e. “*the operational moves that drive design exploration in the case of any individual design, typically not in the awareness of the designer*” (p. 157). He further elaborates that tactics within the design process become a strategy once the designer becomes aware of towards his tactical approach and consciously formulates and reformulates his approach (Bafna, 2001). Bafna concludes that architecture is essentially the design of a strategy for the design of buildings.

Once this instrumental set- ideas that designers think with-is made explicit and raised to the level of ‘conscious’ and ‘comparative thought’ i.e. the designer is aware of their existence, knows how to use them, and reflects upon them, this social knowledge becomes ‘analytical knowledge’ and buildings become architecture (Hillier, 1996). Thus, architecture exists when “*we build aware of the intellectual choice, and we therefore build with reason, giving reasons for these choices.*” (1996, p. 46). Thus, the object of architectural thinking is not the “ideas to think of” i.e. what the building is, but rather the ‘ideas to think with’. As such, architecture is not the mere application of the “ideas to think with” in the design process; but rather, the critical reflection about these ideas and how they are employed in a design logic to address a design task.

Therefore, architecture only exists when there is a theoretical intent within the design process that exceeds the design task. This intent manifested in the choices made through the design process should be recognizable in it the final form of the building i.e. in the form of the building one can detect systematic intent. Hillier concludes that “*a building is architecture when we see evidence in the building of a systematic intent, which requires the abstract and comparative manipulation of form within the general realm of architectural possibility...*” (1996, p. 47). As such, the logical form of the building is not only produced by critical reflection through analytical knowledge but in itself was the object of critical thinking during the design process. Furthermore, it can be argued that what designers add to buildings, reflected through logical form comes through ‘how’ designer/s tackle the design task or through their ‘formative idea/s’ . According to Clark & Pause (1996) a formative idea is a concept which the designer can use to influence or give form to design. The idea offers ways to organize decisions, to provide order, and to consciously generate from.” (Liou, 1992)

To draw on the theoretical discussion above closer to the topic of this thesis, one can say that ‘*what*’ the designer should think *of* is the Islip Courthouse building i.e. a functional building type represented by a design program. ‘*How*’ Richard Meier thought of the design of the Courthouse is represented through the final form of the building i.e. its logical form, expressing the ideas Meier thought *with* in his design logic.

To summarize; one can say that courthouses are the object of design or ‘what’ is to be designed. The ‘what’ materializes through a design ‘strategy’ that refers to ‘how’ the design was developed. Accordingly, designers’ intentions are transformed into the instrumental set of a design strategy. As it becomes discursive, the design strategy becomes a part of the ‘creative intention’ of the designer, and respectively, the design becomes a part of the designed form of the courthouse. In other words, the design logic is expressed in the building i.e. within the formal attributes of the building. In that case, the attributes of the object are a manifestation of the intellectual design logic that produced them, thus, designers’ intentionality is no longer embedded within the design process but rather made intelligible in its own right through the properties of the artifact or any of its representations. Accordingly, through morphological analysis of the attributes of the courthouse building, one can reconstruct the ‘how’ i.e. the logic of design, and moreover reestablish the intentions of the designer/s.

As seen from the discussion above, design in architecture is an intentional process that involves critical reflection, which aims at creating a building that goes beyond addressing the immediate requirements of the design charge to address more theoretical issues in the design brief. As such, the next section will address the design as a process framing the interaction between the design charge and the design brief.

2.4 A General Understanding of the Design Process

The notion of design is not limited to the fields of architecture and urban design; lawyers design a strategy for the defense of their client, team coaches design a plan to win games, industrial designers design products for a variety of uses, etc... Thus, design refers to a wide range of activities in real life. Accordingly, literature on design is varied depending on the field it is discussed within and there is a wide variety of interpretations given by various researches and theorists on what is meant by design. The aim of this part is not to present an exhaustive survey of the notion of design but rather a limited yet a comprehensive discussion that would support the argument of the thesis.

To start with, design as a word has a multiplicity of meanings depending on how it is used. The multiple meanings can be noted from the multiplicity of definitions found in the dictionary where also design is either defined as a verb: “*the act of working out the form of something; the creation of something in the mind.*” Or as a noun: *something intended as a guide for making something else; "a blueprint for a house"; an anticipated outcome that is intended or that guides your planned actions; a preliminary sketch indicating the plan for something; "the design of a building"*, or as synonymous to intention or purpose. Authors and researcher in the field of architecture agree in general that design can be looked at as either a verb i.e. an activity or a ‘process’ or as a noun that refers to a ‘product’: While trying to define architecture, Hillier (1996) accepted design as a ‘product’ and a ‘process’. Hill (1999) using the word *Disegno* to refer to design, saw design in relation to architecture, as holding two aspects: a designed object (architecture as a work of art) or a form or scheme for an object, and a process of producing the form or the scheme for a project.¹¹

Hence, design can refer either to an activity i.e. process, or a noun i.e. artifact. The discussion here will start by discussing design as an activity. According to Lang (1987) and Kalay (2004) design as an activity is a process that one engages in with the intention of changing a current situation into a desired one. Design is not an aimless process; rather it has a purpose to achieve something that is related to a need/s¹², accordingly, design as an activity can be defined as a purposeful human activity aiming at transferring human needs and intents into embodied artifact/s (Gero and Rosenman, 1998). As such, design starts with a purpose or an intention to satisfy a certain human need/s, that need is translated to a function of the designed object where the object behaves in a certain manner to satisfy the need. In order for the object to behave in a required manner to achieve its function, it needs to be structured accordingly. As such, design proceeds from

¹¹ In his argument, Hill follows the Alberti’s tradition where there is a separation between building and designing.

¹² These needs can be placed in three levels according to Chadirji (1983): Visceral Needs, which are the most objective need because it is an instinctive need in which perception and comprehension don’t have a great influence. Somatic needs, which are man’s means to contact with the outside world and interact with it. It is a subjective need because it goes through the medium of senses. Comprehension or Conceptual Needs, which are the highest of these needs because they included highly subjective values and are related to cultural aspects.

a *semantic* conceptual description of a need to a concrete *syntactic* description of an artifact presented as a solution to a problem created as a representation of that need (Figure 2-1).

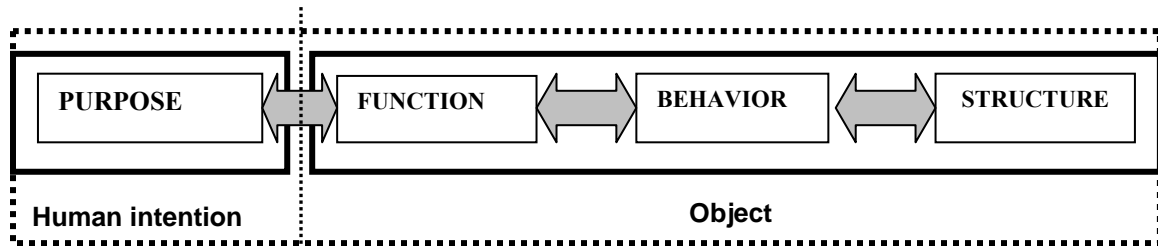


Figure 2-1 a model of the design process as a progression from to semantic human intention to a description of an artifact aimed at achieving the human purpose.

As a noun, design refers either to a representation of an artifact i.e. a set of instructions or drawings in the case of architecture, that represent the artifact to be, or the artifact itself as actually constructed (Forty, 2000). Forty made this distinction based on an argument presented by Vacsari (1568) who defined design as “*nothing but a visual expression of the concept which one has in the intellect*” (Cited in Forty 2000). As such another distinction can be made between design as the work of architecture in its materiality or construction, design as a representation of a work of architecture, and design as an abstract underlying form or artistic idea expressed in a set of representations. This distinction between design as expressed in drawings and the construction of a building was symbolized by Alberti at the beginning of *De Re Aedificatoria* as the whole art of building consists in the design, and in the structure. Thus, the distinction that the thesis made earlier between the logical form and the material form of the building is supported by Alberti’s distinction. Therefore, in architecture, design is a process that realizes an abstract form or idea and brings it into the world.

But the process is not as easy: as stated by many researchers (Simon, 1977, Cross 1984, Rittel, 1984, Lawson, 1994) design problems are ‘wicked’ or ‘ill-behaved’ in nature: they are opposite to what is known as ‘tame’ problems where the starting point is

well defined and known, the end product is also known and the path/method to reach the end point is also known. For wicked problems; the problem is not well defined, the result is not very clear, and the method to achieve the goal is vague; design problems are original or unique where each design situation has its own characteristics and no two situations are the same, thus there is no fixed formula and each situation has to have its own solution; design problems are variable where the problem is constantly changing, the designer changes and the clients may always change their minds; problem formulation is parallel to the solution in the design where understanding the problem is part of solving it, and finally, design problems are rational as well as irrational.

Researchers and authors in the field of design studies have constantly tried to understand how designers think and in the hope of theorizing design models, propose design methods and apply the understanding to understand designs and design processes. As such, many researchers and authors gave different descriptions and characteristics of the design process as logical structures and processes: for instance, design was looked at as problem solving (Simon, 1971), design as conjecture-analysis (Hillier, Musgrove, & O'Sullivan, 1972), design as abduction (March, 1976), design as exploration (Robinson, 1986) i.e. puzzle making, and design as formulation (Peponis, 1993; 2005, Peponis et. al. 2003). This thesis will address the issue of design as formulation as a general framework governing the interaction of the design charge and the design brief, but in order to do so, the thesis reviews design as problem solving and design as conjecture-analysis in order to show why design as formulation is used as a theoretical framework for addressing the interaction between the design charge and the design brief.

Design as problem solving was proposed during the 1960's by the design methods researchers who proposed looking at design as a problem solving process by firstly extensive problem analysis, systematic problem synthesis, and evaluation (Cross, 1986). This gave rise to the analysis/synthesis/evaluation (A/S/E) model of design process that represents design as problem solving. The model was first introduced by Herbert Simon and Allen Newell in the early 1960's and implemented in their General Problem Solver

(GPS). This model follows the steps of traditional scientific methods¹³ and is composed of: brief, stating the requirements of design; analysis, where the problem is analyzed and decomposed into parts, goals and objects are set, and performance specifications are specified in advance; synthesis, where ideas are generated and the decomposed parts are synthesized into a solution; and evaluation where the generated solution is evaluated against the performance requirements set during the analysis phase (Broadbent, 1963).¹⁴ Nevertheless, this process is characterized by linearity and separation; design phases go in sequence, and there is a separation between each design phase where for instance, design analysis ends up with the definition of the design problem, and synthesis begins as a response to that problem. Here, design begins from a previously defined ends and accordingly, it is goal-oriented and only responds to these previously defined ends.

Since design problems are wicked or ill-defined as mentioned earlier, they can not be comprehensively stated or formulated completely before the beginning of the design process, in addition, many of the design issues that have to be addressed arise during the design process and not before it. Furthermore, design as problem solving assumes the complete objectivity from the designer's side when addressing a design problem, which is not true, especially in the case of architecture. Accordingly, the (A/S/E) model or design as problem solving falls short in explaining how the final form of the building manifests the interaction of the design charge and the design brief.

As a response to the short comings of the (A/S/E) model derived from traditional science, Hillier, Musgrove, and O'Sullivan (1972) stated that designers don't design in

¹³ A characterization of that model is that first all facts are to be observed without a preconception or a priori; second, the observed facts are analyzed, compared and classified without a hypothesis (analysis); third, generalizations are drawn from the analysis inductively (synthesis); and fourth, predictions are made. This is a summary cited in Bamford (2002) of what the 20th century economist A. B. Wolfe characterized the scientific method.

¹⁴ 20 years later, while presenting a commentary on design methods, Broadbent (1986) suggested looking back at the philosophy of science but this time at another source of inspiration for design methods. His source was Karl Popper where Popper sets up a theory i.e. a hypothesis and then disprove it either himself or through a community of practice. Thus, Broadbent suggested that the idea of setting up theories and then refuting them can also be carried into the generation of architectural form. Thus in the model presented above Broadbent added another part between analysis and synthesis: Analysis, Conjecture/hypothesis, Synthesis, and Evaluation. Nevertheless, Broadbent still maintained the linear sequence stating that there is a logical sequence between analysis and evaluation, and from synthesis to evaluation.

the same manner in which traditional science does; they based their assumption on the premise *“designers must, and do, pre-structure their problems in order to solve them.”* Thus, designers use conjectures or preconception to structure their search for a design solution. They used the analogy with the philosophy of science, but this time with reference to Karl Popper, where Popper uses a hypothesis and then tries to refute it or invites the community of science to refute it. The presented hypothesis maintains its position as being right until proven otherwise. Thus, following the model of Popper, they argued that design is a matter of

“Pre-structuring problems either by knowledge of solution types, or by knowledge of the ‘latencies of the instrumental set’ i.e. the potential for available technological means-and knowledge of ‘informal codes’ which relates users’ needs to solution types and instrumental sets.”

This pre-structuring represents conjectures that help the designer to structure the vast problem space in order to narrow it down and thus making the solution space more attainable. As more data is gathered and brought into the design process as conjectures become more defined as more data is collected and the conjecture is tested. This model became known as the Conjecture/Analysis (C/A) model for design.

Within this model, problem definition and conjecture advance side-by-side rather than in sequence, thus analysis and synthesis are part of a cycle in which each refines the other. Furthermore, these conjectures don’t depend on data analysis alone, but have varied sources such as the designers’ expertise, previous knowledge, existing typologies, etc... In that sense, design is developed by gradual ‘refinement of an early conjecture’ (Cross, 1986).

The C/A model can be defined as design exploration, where exploration *“suggests that there is more than way to proceed, that the goal itself is not fully known, that the method of getting there has an impact where you end up, and that the ending point is only a temporary end point or resting spot, and that is one of many possible rest points.”*

(Robinson, 1986, p. 68). Furthermore, unlike the analysis/synthesis model goals are not defined in the beginning and the solution is configured in the end, goals are gradually uncovered, and the solution gradually ‘both conceived and perceived’. It is worth mentioning that Robinson also suggested the use of hypothesis in design where *“architectural artifact becomes not simply a physical object, but an object plus a set of intentions which are made explicit, and which can be tested.”* (1986, p. 70). By making design intentions explicit, the design process is allowed to test the design formed as a hypothesis against the explicit intention.

The issue of design as a hypothesis that can be tested confirms with the idea of March of design as abduction, and the idea of the ‘primary generator’ that Lawson developed after Darke (1978) where the designer comes up with a basic idea about the form a solution can take and a crude design is generated on the basis of that idea and then tested against design requirements, goals, constraints, etc... Thus, it can be concluded that designers come to understand the design problem through solving them, or what Lawson (1994) called it *‘analysis through synthesis’*. Furthermore, it is also obvious that designers don’t address the design issue objectively, they bring their own prejudices and concerns into the design process to generate solutions.

According to the discussion above, it seems that the model of design as conjecture-analysis is a good model through which the interaction of a design charge and a design brief can be addressed since this model acknowledges that designers bring to the design process. But according to Peponis (2005) the conjecture-analysis model of design falls short in describing what happens during a design process because of two concerns: first, it only addresses ‘known’ solution types and instrumental sets as means for addressing a design problem, thus failing to address the issue of new or innovative designs, and second, it does not factor in the role the emerging characteristics of the designed object play in the interaction between the design brief and the design charge, thus, determining the final form of the building. As such, one can conclude that designers reformulate their design problems according to their design briefs as well as the emergent characteristics of a proposed design solution to formulate the form of their final solutions,

as such, Peponis (1993, 2003, 2005) proposed to look at design as a process of formulation.

2.4.1 Design as formulation

In an article entitled *Evaluation and Formulation in Design* published in 1993, Peponis described design as being formulation over and above problem solving. Using Le Corbusier as an example, Peponis, affirmed how design involves “*self imposed compositional disciplines, over and above the satisfaction of the programmatic requirements and the negotiation of the geometrical constraints involved with individual projects and sites.*” (1993, p. 57) in order to argue that design formulation enhances the morphological possibilities of a designed form through a clear understanding of compositional principles and coherence that go beyond the functional and programmatic requirements of a design situation.

In their paper *Spatial Models, Design Reasons and the Construction of Spatial Meaning*, Peponis, Lykourioti, and Mari (2002) elaborated further on the concept of design as formulation by stating that design as formulation also includes the clarification of design ends within the process of design as opposed to prior to it. The notion of the clarification of design ends during the design process has been noted earlier by Schön (1987, 1990). Donald Schön (1987) advocated the importance of developing artistry in practice, where he believed that in a reflective practice, designers learn to design first by looking at the design situation" or in different ways i.e. critical thinking, under the guidance of a design instructor, thus, leading to a new understanding and a higher level of creativity, and second by the direct interaction with the "the materials of a situation" or the emergent characteristics of the proposed design solution. As such, design can be looked at as a reflexive activating that result from the designers' reflection on the outcomes of their design proposals. For Schön, the process of designing is carried out via small steps that involve investigating, proposing solutions and reflecting on outcomes and the changes in knowledge about the design situation.

In the same paper, Peponis, Karadima, and Bafna (2003) differentiated between design as problem solving, and design as formulation. Design can be regarded as problem solving when design ends are relatively well defined at the beginning of the design process and design solutions are mostly informed by precedent, habit, or convention. As such, Peponis, Karadima, and Bafna (2003) included the conjecture-analysis model under the umbrella of problem solving despite the fact that structural differences exist between them. In this case, design as problem solving aims at satisfying a set of ‘pragmatic functions’ or the design charge as defined earlier i.e. a set of previously given requirements such as use, function, and performance with previously understood principles of form and function.

In a recent literature review concerning design theory between 1965 and 1997 by Love (1997) that surveyed how the engineering field characterized design, design as formulation was not included in the manner proposed by Peponis and his colleagues i.e. an interaction between a design task, the design logic of the designer, and the qualities of an emergent solution. Nevertheless, the proposition of such a process can be found in the field of cognitive science, in particular that of distributed cognition as advocated by Hutchins in his book *Cognitions in the Wild* (1995).

For Hutchins, human knowledge and cognition are not confined to the individual’s brain; rather, it is distributed by placing facts and knowledge in objects, individuals, and/or tools in the surrounding environment of a certain task. Therefore, distributed cognition views the system involved in performing a certain task as a set of representations distributed spatially between individuals and artifacts and temporally as a function of the history of a particular culture (Vicente, 1999). These representations can be either in the mental space of the participants or external representations available in the environment. This view of performing a task supports the view of design as formulation because design in that sense is seen as a system of interaction between a given design task, the designer, and a representation of an emergent designed object.

Design is regarded as formulation when the end results of the design process are not clearly defined at the beginning, and accordingly specification of ends cannot be

separated from the exploration of means and the criteria of evaluation are partly derived from the largely axiomatic premises established within the design itself. As such design, can be regarded as an explorative and creative process concerned more with the formulation of a way of thinking in a design situation rather than the application of a way of thinking to a design problem situation (Peponis, 2005). Thus, in design as formulation, design decisions are not only linked to ‘pragmatic functions’ alone but also to the process of design and the logic that is applied to the generation of form. In this case, the product of the design process is object of design in its own right, over and above the need to satisfy pragmatic functions, created by *‘additional form-generating principles which are axiomatic to design.’*

In that sense, the design goes beyond the charge, and addresses the brief as defined by Baxandall (1985). Thus, by combining the charge and brief, an intentional design process along with the awareness of the properties of designed object itself design becomes an *“exploration of possibility with geometric, physical, and functional constraints.”* (Peponis, Lykourioti & Mari, 2002). As such, the designed artifact becomes the product of an ‘intentional’ process that is not only embedded within the designed object but clear and explicit in its formal properties, thus reuniting the ‘design logic’ and ‘object’ as one.

Nevertheless, Peponis, Karadima, and Bafna (2003) claimed that the brief is not enough to explain design as formulation because it does not include design properties that emerge during the design process. As such, Peponis (2005), in a latter paper, defined the process of design formulation as the interaction that takes place between the design charge, the brief, and the formal structure of an object i.e. properties of the object as designed. He further noted that the structural properties of the product of design formulation are neither implied in the charge, nor in the brief, but are emergent and created during the design process.

The view that innovation in design as a formulation comes from the interaction of the design task, the designer, and the emergent qualities of the designed object is

supported by cognitive science studies: through reviewing the work of an artist-blacksmith producing artifacts, Keller and Keller (1996) affirmed that the production of novel products and practices involves not only the ability to work with the dimensions of relevance given by a task, within the constraints of enduring first principles required for accomplishing the task practiced by the blacksmith, but also in the ability to see new relations independent of any preconceived dimensions. These relations emerge, among others, from the affordances of the emergent qualities of the designed artifact.

Since the designs of buildings are expressed in forms, one can look at the design of a certain building as the interaction between the design charge i.e. design desiderata, a formal language of design i.e. a particular syntaxes that would realize the previously unspecific desiderata, thus, transforming the loose topological intuitions, motifs, and themes into specific geometric form, and the emergent properties of the produced form. Accordingly, the final form of a building produced by design as formulation can be read as sets of shapes placed in deliberate geometrical relationships with each other in 2D and 3d Euclidean space governed by design principles. The aim of geometric composition is not to only address the program but to convey meaning that goes beyond the immediate requirements of the program, and address intentions; accordingly, it would be possible to recognize deliberate intentionality in the assembly of the object.

Thus, a building can be looked at as an object of design i.e. a formal logic, in its own right resulting form generative design principles that are axiomatic to the design process and exceed the satisfaction of instrumental functional needs and requirements (Peponis, 2005). As such, the building designed artifact can be understood as a material construction governed by intellectual requirements (logical form) superimposed over the functional requirements (design charge), and mathematical and physical necessities (technology and construction).

In that sense, buildings generated by design as formulation, through the application of intellectual requirements, become formal structures that exemplify¹⁵ generic abstract concepts that transcend a specific building and can be extended to include any number of other buildings (Peponis, 2005). In other words, formal properties exemplified by a specific building e.g. symmetry, proportion, etc...are still general organizing principles that can apply to any other building. Nevertheless, the description of these abstract concepts in a certain building depends on the specific composition of that building and accordingly, becomes object dependent. In that sense buildings concretize, to use Cassirer's (1955) term, these abstract concepts and shape them rather than represent them becoming, according to Cassirer, symbolic forms. These symbolic forms are particular design instances in a particular design situation but at the same time, through their formal properties, they are members of larger family exemplifying abstract organizational and generative principles.

According to Peponis (2005) design formulation as intended by the designer prospectively results in a systematic realization of design intentions and more systematic application of design principles and configurational properties. Retrospectively, once the design as formulation product is investigated, it allows for more properties to emerge because it is replete with properties that are unintended and emergent. Furthermore, looking at products of design formulation offers an account of how properties that important to generic and specific functions¹⁶ and well as properties of the physical construction interact and become a part of a higher formal logic that governs the structure of the overall design.

¹⁵ Exemplification here is used in the sense that Goodman (1988) used it as opposed to denotation. Denotation, which includes naming, description, and depiction, is a symbol that applies to something else. A building exemplifies something when it i.e. a symbol refers not to another object but to a quality/s that either apply to it or to properties that it possesses.

¹⁶ Through their configurations as spaces, every building besides its global function i.e. building type, specific pragmatic functions e.g. living room, performs generic functions. These are arranging spaces into relational patterns, channeling movement, create patterns of co-existence and co-presence, and creating opportunities for social interaction and communication. Once these functions are arranged according to a specific purpose or building type and furnished in a specific way, they support pragmatic functions.

Thus, it can be argued that through morphological analysis of the courthouse building, a description of *a-posteriori* of the building can be given with the aim of constructing or reconstructing *a-priori* that took place before the design began or as part of the design logic during the process i.e. the morphological analysis does not reconstruct the design process but aims at retrieving some aspects of the design logic underlying the final form of the building. This a-priori includes the design charge of the courthouse building, the design brief or the formal language of Meier, and the intentions of the Meier. According to Peponis (2005), this involves the use of additional representations such as drawings and diagrams of the object. The function of these representations is to capture aspects of the formal logic of the building and present them discretely. These representations capture the manner abstract concepts were employed and devised within the design of the building.

As such, within the framework of design as formulation, one can understand the final form of the Islip Courthouse building designed by Richard Meier as the interaction between the design charge of a Federal Courthouse building within a certain context i.e. functional and programmatic requirements within a context, a design brief that constitutes of the formal language of Richard Meier plus the intentions Meier, as a designer, adds to the design building and the issues he sets himself to address beyond the programmatic requirements, with the formal properties of the courthouse building as a designed object in itself. As such, the formal attributes of the building reflect the design charge, aspects of Meier's formal language, and express the abstract intentions addressed by Meier in the design of the Courthouse building. To allow for the morphological investigation of the Islip Courthouse building, chapter three will define the design charge, and chapter four will address the design brief.

2.5 Chapter summary

This chapter identified the theoretical framework of the thesis. Within the thesis, buildings can be understood as spatial organizations and as logical forms. The spatial organization deals with the structuring of the internal space inside the building to house

activities related to the functioning of the institution inhibiting that building. the spatial organization of the building is described through the building program. A strong building program refers to the limitations and constraints the program imposes on the morphology of the proposed layout in a sense that a limited number of configurations is possible. Understanding as logical forms refers to the understanding of how the formal structure of the building is regulated and ordered. The formal logic of the building is expressed through a design formal language. Thus, the final form of the building can be understood as the interaction between the program i.e. generic principles and rules specified by the program, and the generic principles of form specified by the formal language.

The building program refers to ‘what’ the designer has to address in a design situation or the design task, while the formal language represents ‘how’ the designer addressed the design situation. Baxandall (1985) referred to the ‘what’ as the design charge i.e. design desiderata, and to ‘how’ as the design brief i.e. formal language. Thus, as a preliminary conclusion, the final form of the building can be understood as the interaction between the design charge and the design brief.

Buildings become architecture when the formal design language becomes explicit rather than implicit i.e. the designer thinks of the formal language to solve the design problem, thus, addressing theoretical and conceptual issues that extend beyond the ‘what’ is to be designed. Thus, the design process becomes a process of formulation where the intentions of the designer is to create an object of design that goes over and above the requirements of the design charge and the design brief.

Within design as formulation, the formal structure of the building not only expresses the interaction of the design brief and the design charge but also the effect of the emergent qualities of the building as it is being designed. Accordingly, the final form of the building becomes the physical manifestation of the design intentions and the design process.

3 CHAPTER 3: RECONSTRUCTING DESIGN CHARGE, BUILDING PROGRAM AND OBJECTIVE DESIGN CONSTRAINTS

3.1 Introduction

This chapter discusses the design charge that initiates federal courthouse design in the USA. The aim is to reconstruct the design problem as it is given at the outset of a commission for a new courthouse such as the one in Islip. The first sections of the chapter discuss the charge as it is specified in two contrasting sets of documents. The first set, mainly using the Design Excellence Guide book as a reference, expresses the aims of the Design Excellence Program, which are largely qualitative and symbolic: how to improve the architectural quality of public buildings and enhance the architectural expression of the judicial system and the state more widely. This can be regarded as the design context under which the Islip Courthouse building was commissioned. The second set encompasses various forms of design guidance and programmatic requirements that dictate courthouse design. These would represent the more specific but still generic to all federal courthouses design desiderata of the Islip Courthouse building. These requirements are often presented in the form of outline layouts which illustrate the spatial relationships that should be held to support the proper functioning of the courthouse. Taken together, these two parts of the design charge point to the essential architectural question: how to work within the rather explicit constraints documented in design guidance while seeking to arrive at an architecture which responds to the broader aims of the Design Excellence Program.

However, the review of documents is not a sufficient basis for reconstructing the design problem situation at the outset of a design commission. In order to complement the insights afforded by a review of documents, a sample of recent courthouse buildings designed and built under the Design Excellence Program and subject to the design guidance and programmatic requirements mentioned above will also be analyzed. The aim of the analysis is to capture the actual invariant characteristics of the buildings thus

drawing inferences about programmatic constraints and architectural possibility. In other words, the idea of a building program is interpreted not merely as a set of common requirements, but also as a set of common responses, that have implications of the functional and formal configuration of the courthouse building.

The analysis of both documents and precedents leads to a more clear and precise understanding of which aspects of Islip's design conform to the prevalent understandings of the design charge. Thus, this chapter prepares the way for the next chapter, where Islip is analyzed in order to identify the aspects of its form that are governed not by the design charge but rather by the design language of the architect and by the formulation of design aims that the architect engages within the process of design itself.

3.2 The General Services Administration's Design Excellence Program

The General Service Administration (GSA) is the landlord for the federal government.¹⁷ Its responsibilities include leasing space to federal customer agencies and repairing, altering, and renovating existing facilities.¹⁸ Federal properties under the supervision of the GSA include border stations, courthouses, office buildings, laboratories and data processing centers. As part of its mission, the GSA is concerned with the architectural quality of federal buildings and the contribution that these buildings make to the public realm of American cities. The National Award Program established in 1990 indirectly revealed the falling standards of new federal buildings because most awards became associated with the preservation and restoration of building of the past rather than new buildings of the present. As stated in *Volume 2 of Changing the Course of Federal Architecture, Vision+Voice*, this raised the question of why federal architecture did not have the same high standards it once had.

¹⁷ The total inventory of workspace the GSA is responsible for is over 330 million sq. ft. for a million federal employees in 2,000 American communities. This comprises over 1,600 government-owned buildings, or approximately 55 percent of the agency's total inventory. The remaining 45 percent is in privately-owned, leased facilities.

¹⁸ For a review of the responsibilities of the GSA, see www.gsa.gov.

In response to the question the GSA brought together a panel including members of the awards juries, prominent professionals, members of the AIA and the National Endowment for Arts, in order to discuss the production of ‘well-designed’ buildings. This led to a discussion of the ‘quality’ of the lead architect responsible for the design of a federal building. It seemed at the time that architectural firms put their ‘third team good enough for the government’ designers on federal projects. To reverse this trend the GSA placed emphasis on the quality of the lead architect, and set up a couple of pilot projects where the professionals from the private sector took part in the selection process of architects and the design reviews of several of its new courthouse buildings. The process proved to be successful and the GSA initiated the Design Excellence Program in 1994 in order to build on the success of the pilot projects. .

The Design Excellence Program is concerned with both the selection process of the lead architect/engineer for new federal construction projects as well as the selection process of design proposals for new buildings. Thus, the GSA established the Design Excellence Program to improve the quality of Federal architecture and change the course of public architecture of its federal buildings. In its quest, the GSA cites its inspiration from the Guiding Principles for Federal Architecture drafted in 1962 and reported to the president by the AD HOC committee on federal office space, June 1962 by Daniel Patrick Moynihan (cited in *The Design Excellence Program Guide*, 2000):

- 1. The policy shall be to provide requisite and adequate facilities in an architectural style and form which is distinguished and which will reflect the dignity, enterprise, vigor and stability of the American National Government. Major emphasis should be placed on the choice of designs that embody the finest contemporary American architectural thought. Specific attention should be paid to the possibilities of incorporating into such designs qualities which reflect the regional architectural traditions of that part of the Nation in which buildings are located. Where appropriate, fine art should be incorporated in the designs, with emphasis on the work of living American artists. Designs shall adhere to sound construction practice and utilize materials, methods and*

equipment of proven dependability. Buildings shall be economical to build, operate and maintain, and should be accessible to the handicapped.

2. *The development of an official style must be avoided. Design must flow from the architectural profession to the Government, and not vice versa. The Government should be willing to pay some additional cost to avoid excessive uniformity in design of Federal buildings. Competitions for the design of Federal buildings may be held where appropriate. The advice of distinguished architects, as a rule, ought to be sought prior to the award of important design contracts.*
3. *The choice and development of the building site should be considered the first step of the design process. This choice should be made in cooperation with local agencies. Special attention should be paid to the general ensemble of streets and public places of which Federal buildings will form a part. Where possible, buildings should be located so as to permit a generous development of landscape.*

It should be noted that the above passage entails a number of ideas which remain ill-defined while at the same time assuming great positive value. These include the desirability of a “distinguished architectural style and form” while avoiding “an official style”. These more abstract ideas act like a framework for design formulation, they prescribe an open-ended target. At the same time, the passage includes some more precise recommendations such as the reference to “regional architectural traditions” and the insistence on the importance of site selection as part of the overall design process. The mixture of precision and more abstract aspiration is carried into the design excellence program.

The opening statement of the Design Excellence Program Guide, under the heading “building a Legacy”, is by Robert A Peck: “*Public buildings are a part of a nation’s legacy. They are symbolic of the Government is about, not just places where public*

business is conducted.” As the builder and steward for the Federal civilian Government buildings, the General Service Administration (GSA) is committed to “*preserving and adding to America’s architectural and artistic legacy.*”

To achieve its goals, the GSA seeks ‘the most creative talent’ in a wide spectrum of professionals whether in well-established firms, emerging talents, or small businesses, and woman owned businesses. The aim of such a selection is to ‘recognize and celebrate the creativity and diversity of the American people.’

The process of selecting architects and engineers usually involves two phases: in the first phase, interested architect/engineer firms submit portfolios of accomplishment that establish their design capabilities with an emphasis on the lead designers. Based on the evaluation of the portfolios a short list of firms for further consideration is prepared. In the second phase, the focus is upon each firm's entire project team. For some projects the short-listed teams may be required to submit actual design schemes.

During both phases, the GSA benefits from the expertise of non-government professionals drawn from the GSA’s National Register of Peer Professionals that lists 70-80 peer professionals appointed by the PBS Commissioner. These individuals represent different groups including private sector architects, engineers, and artists. They contribute to the selection of the A/E teams and help to ensure that decisions are focused on ‘design Excellence’.

The aim of the Design Excellence Program Guide is to ‘*clarify critical elements in the program*’ and enable different parties taking part in the process to become ‘partners in design Excellence and creators of an architectural legacy that all Americans can point to with pride.’ The guide comprises four main parts in addition to the preface already mentioned.

The first part of the guide deals with project planning. It includes a description of the two and three stage selection processes of the A/E team. These processes are intended

for the selection of the design firm and its leader, not a particular design. As stated in the Program Guide, the two-stage selection process is more suitable for a renovation or remodeling project, while the three-stage process is more suitable for a ‘high profile public building’. The aim of the first stage of the selection process is to ‘solicit design portfolios’ and make a ‘short-list’ of design firms and design leaders. The second stage involves team interviews of the short-listed teams that qualified from stage one and ranks these teams after interviews. If there is a third stage, the A/E Evaluation Board selects the teams that advance to stage three. The aim of stage three is to present a ‘design vision’ for the project. This is elaborated over a 30-day Vision Competition where the A/E team presents three design alternatives for critical review. This vision is evaluated by an independent jury selected by the Chief Architect with the advice from the Professional Advisor. The whole process, including the third stage extends about 32 weeks.

Once an A/E team has been selected, the prospective team has to present a design program. In stage I, the design program includes: identifying the site, estimating the gross area of building, stating user and occupant needs, studying the spatial components of the program, estimated costs, identifying U.S. Government initiatives applicable to the project, identifying critical design issues, and studying parking and special circulation requirements. A stage III design program includes the following at minimum: Design program statement, functional goals and objectives, general building requirements, special requirements, building form and urban design criteria, and finally, parking and circulation.

The second part of the guide deals with implementation. It provides an example of the requisite Commerce Business Daily (CBD) announcements, sample ads of announcements placed in design magazines, choosing and appointing the A/E evaluation board, and choosing both the professional advisor as well as the Independent Jury.

The importance of the CBD announcement stems from the fact that it is ‘the regulatory document for the entire process.’ As such, the document is carefully worded and arranged.

Ads in design magazines are aimed at notifying the profession and in particular ‘new and emerging talent’. The intention of the ads is ‘to describe the project and the selection process and tell the potential participants where to go for additional information.’

The A/E Evaluation board is made up of five voting members including an architect, an engineer, a representative of the Chief Architect Office, one private-sector designer selected from the GSA National Register of Peer Professionals, and one representative of the client organization/s. The board members are selected based on expertise, high standing in their respective fields and in-depth knowledge. Their work should be carried out in an atmosphere of respect and collaboration. There can be non-voting members, one from the client’s organization and the other from the GSA. The Professional advisor is a consultant for the GSA that is ‘responsible for planning, organizing, and managing the design competition’ so as to attract outstanding talent for the GSA project. The GSA selects potential candidates for this position by soliciting nominations from the architectural community, or through announcements in the design professional press. The Independent Jury members are private-sector professionals that act as an advisory body in a three-stage selection process. They also evaluate the design submissions of A/E teams in the stage III. The members are selected by the Office of the Chief Architect, and most likely appointed from the National Register of Peer Professionals. The Independent Jury model includes a design educator, an architectural critic, and a practicing architect experienced in that project type. The evaluation takes place without knowledge of authorship. The A/E Evaluation Board decision takes into account the Independent Jury recommendation and weights them against the evaluations arrived at in the second stage. .

The third part of the guide deals with procedures and presents sample documents regarding each of the stages. For the first stage, the sample of documents includes an example of a building program. This is taken from the competition for the courthouse at Eugene, Oregon and will be discussed in a subsequent section of this chapter. Evaluation criteria for choosing the design firm are also specified as follows: past design

performance (35%), philosophy and design intent (25%), lead designer portfolio (25%), and lead designer profile (15%). Samples of acceptance and rejection letters to be sent to the participating design teams are included. Materials regarding stage II include samples of letters regarding submissions, invitation for a networking session, along with instruction for the A/E Evaluation Board, Evaluation criteria, and evaluation sheets. The evaluation criteria for this stage are: 1) team design performance (50%) bearing in mind the architectural and engineering challenges; 2) team organization and management plan (30%); 3) professional qualifications (15%), and 4) geographic location (5%) where the A/E team should demonstrate that at 35% of the services the A/E team has to perform is within the geographic boundaries of the project. With regard to stage III of the selection process, material in the guide include a design program sample, along with submission requirements, briefing agenda, A/E evaluation, and jury worksheet and ranking form.

The fourth and final part of the guide stipulates that the selected A/E team is required to develop three alternative schemes for review. One of these alternatives or a combination of more than one will be later adopted for further development. The process of review is carried out by the PBS assisted by private sector peer who served on the A/E Evaluation Board along with two other private-sector peers. The private-sector peers play critical roles within the review process. They include an educator who facilitates the discussion between designers and non-designers; an advocate who represents the voice of those whom the project concerns and are not taking part in the discussions e.g. users, clients, employees, etc; a provocateur who asks critical and sensitive questions that others may be reluctant to ask and makes judgment based on expert knowledge and experience; and consensus builders help guide the discussion on design quality and maintain the question of quality in focus; finally, the communicator makes sure that everyone involved in the discussion has the same interpretation and understanding of what been said and discussed. Peer discussions take place both in the presence of the A/E team and in private.

Overall, the Design Excellence Program is much more specific about process than about the desired qualities of building design. Thus, even though programmatic

constraints are acknowledged, namely by the inclusion of an exemplar building program, the overall purpose of the document is to allow open ended design experimentation within the parameters of a controlled process. The next section offers a brief review of the implementation of the Design Excellence Program.

3.3 U.S. Federal Courthouse Buildings under the Design Excellence Program

In the early 1990s the GSA created the Center for Courthouse Management to ensure “*the consistent, excellent, and cost-effective delivery of the courthouse construction program.*”¹⁹ The construction program was the result of an analysis conducted by the Administrative Office of the U.S. Courts (AOUSC) that concluded that one third of U.S. Courthouses would run out of space within the next ten years. The GSA embarked on a \$10 billion program to meet the demand for new courthouses in the next 50 years.

According to Wise (2001) U.S. federal design has historically preferred the classical architecture of Greece and Rome, since the framers of the constitution saw classicism as expressive of democratic values. With the coming of modernism, the classical tradition was cast aside, and replaced by modern images and structures. It is generally accepted that much of the federal buildings in the postwar period are seen as bland, faceless structures (Wise, 2001); according to Edward Feiner, the chief architect of the US General Service Administration “*little distinguished most new federal courthouses from generic office buildings as the government procured architects like spare parts.*” (Wise, 2001, p. 76). The aim of the Design Excellence Program is to help reshaping the image of the American judicial system, and hope to change the way people think about the government as a whole. The program is premised upon “*a conviction that architecture can inculcate public values, giving citizens a feeling of enfranchisement and imbuing them with believe that democratic government is a noble price.*” The program hopes at changing the image of the postwar courthouses from “*machines of litigation*” by offering grandeur and thus welcoming the public. Wise (2001) comments

¹⁹ Retrieved from www.gsa.gov on September 26th 2003

that the new courthouses constructed under the Design Excellence Program are “*inarguably more inviting*” and some of them have the “*allure of genuine aesthetics*”. By 2001, thirty-one new federal courthouses have been completed as a part of the General Service Administration’s \$10 billion dollars. Nine of the above mentioned courthouses were developed from start to finish, under the Design Excellence Program preview, and more than 31 courthouses are currently being built or being designed. Other courts are being renovated showing more sensitivity to design and its impact on public perception of the federal buildings. Figure (2-1) shows examples of Federal courthouses designed under the GSA’s Design Excellence Program.

Naturally, the GSA effort has drawn the attention of the architectural profession. For example, two major events concerning Federal architecture and Federal courthouse design were held recently. The first was a national exhibition hosted by the American Institute of Architects New York Chapter in celebration of the upcoming ten-year anniversary of the U.S. General Services Administration. The title of the national exhibition was *Civic Spirit: Changing the Course of Federal Design* featuring twenty federal projects from around the country. The exhibition explored how GSA’s Design Excellence Program has redefined the architect and artist selection and building design and construction processes. The exhibition was accompanied by public programs and workshops including architects and artists discussing current projects on view, and workshops bringing GSA officials and national peers together to describe in detail how architects, artists, engineers, landscape architects, contractors and consultants participate in the various activities of the Design Excellence Program. The second is the *Fifth International Conference on Justice Design* which was held in Chicago between 27th and 29th of October 2004 was sponsored by the American Institute of Architects Committee on Architecture for Justice Knowledge Community. The main theme of the conference was the challenge of delivering Design Excellence in the Architecture of justice.



a



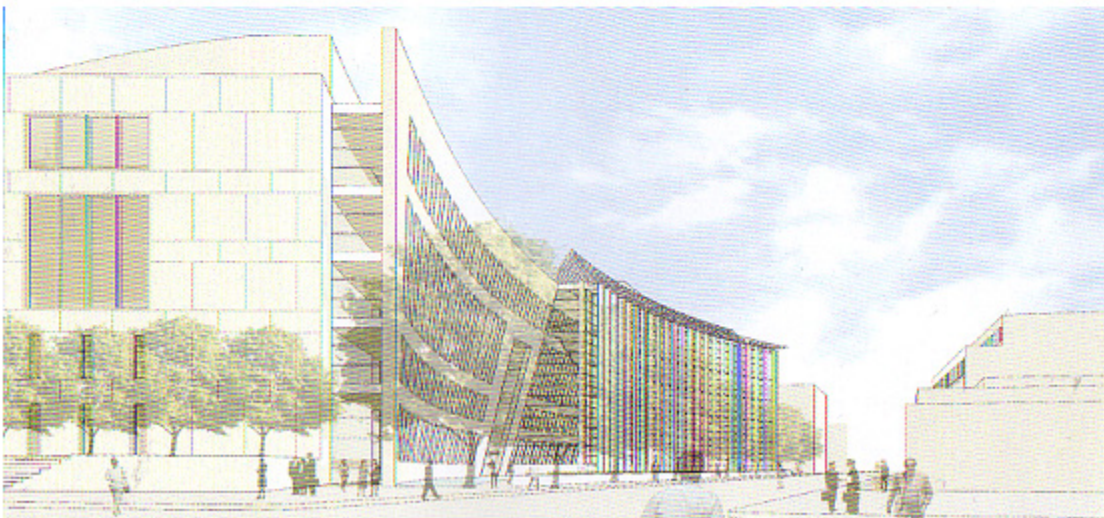
b



c



d



e

Figure 3-1 Examples of contemporary Federal courthouse designs: a) USA Courthouse, Los Angeles, CA b) USA Courthouse, El Paso, TX c) USA Courthouse, Austin, TX d) USA Courthouse, Buffalo, NY e) USA Courthouse, Mobile, Alabama. (Source: Center for Architecture, NY, 2004)

Three volumes under the title *Vision+Voice* document GSA's effort to produce buildings that reflect the change towards federal architecture and further express the stability, vigor, dignity, and diversity of federal architecture. The first volume entitled *Design Excellence in Federal Architecture: Building a Legacy* records the recollections of public and design officials on federal design initiatives from the 1960's to the beginnings of the Design Excellence Program. Volumes 2 and 3 entitled *Changing the Course of Federal Architecture* track the Design Excellence Program by presenting the projects that evolved under its provisions. However, the three volumes offer little in depth criticism.

It should be noted that interest in the Design Excellence Program is not new. In January 1996, the architectural magazine *Architecture* published a whole issue on Federal architecture under the design Excellence Program. The issue had special emphasis on the design of new Federal courthouses featuring the design of more than 30 new courthouses among which the Islip Courthouse Building was the first to be mentioned. In March 1999, *Architectural Record* published a whole issue discussing the design of Federal courthouse including five in detail revisions of contemporary Federal courthouse. *Architecture* in January 2001 published another issue dealing with emphasis on the design of Federal courthouses. The issue did not only include a detailed revision of five courthouses including the Islip Courthouse building designed by Richard Meier, but also cited some of the controversy over the contemporary designs taking the design of the Orlando Federal courthouse as an example: under the GSA Design Excellence Program, and its stipulation that an official style should be avoided, the architectural styles of the courthouses are highly mixed; some firms like Hartman-Cox took a historical approach that seems most desirable to the judiciary, whose profession is based upon precedent. Other designs have been more radical and created some controversy.²⁰ The Orlando courthouse, for example, represents the struggle between the aesthetically conservative judges and the new aesthetics of the contemporary designs. In other places, judges

²⁰ In an article in the Christian Science Monitor, Edward Feiner commented that “architects looking for distinctive new courthouse forms can’t rely on classical Greek and Roman elements as columns that would be dwarfed in a modern half-million square-foot courthouse.”

converted to the crusade to reinvent the courthouse typology of the 21st century (Wise, 2001).

3.4 Design Guidance and Programmatic Constraints Affecting Courthouse Planning

The design of Federal Courthouse buildings is strongly prescribed by programmatic requirements and design guidelines. Specific spaces are developed to accommodate specific functions which affect not only their internal arrangement but also their adjacencies and links to other spaces. Furthermore, access of different groups of building users, is restricted to certain parts of the building; judicial system professionals such as judges, probation officers, court staff, and attorneys can access restricted zones, while citizens with routine business can access only limited public parts of the building. Thus, a key element in understanding the design charge that initiates any courthouse building is to understand the nature of the different functions located within the courthouse, how these functions relate to each other, how they are zoned, and what parts of the circulation system they are linked to, according to the rights of access that govern their use.

The relevant specifications are presented in the *U.S. Courts Design Guide* dated 1997. However, we will also discuss two design guide books, the first by Hardenbergh et. al. (1998) and the second by Philips & Creibel (2003) that also include guidelines about the design of courthouses, which exercise an influence over the deliberations of the GSA and the implementation of the Excellence Program to courthouses. The aim in examining these documents is to render explicit the constraints that are part of the design charge for any Federal Courthouse building.

The U.S. Court Design Guide (1997) identifies ten major spaces associated with the functioning of the courthouse building: 1) courtrooms; 2) judges' chamber suites that include the judge's chamber and its support areas; 3) jury facilities including jury assembly area, 4) trial jury suite, and grand jury suite; 5) court library; 6) clerk's office; 7) judiciary-related offices; 8) U.S. marshals services; 9) court-related facilities such as kitchen and cafeteria; and 10) building support facilities (Figure 3-2).

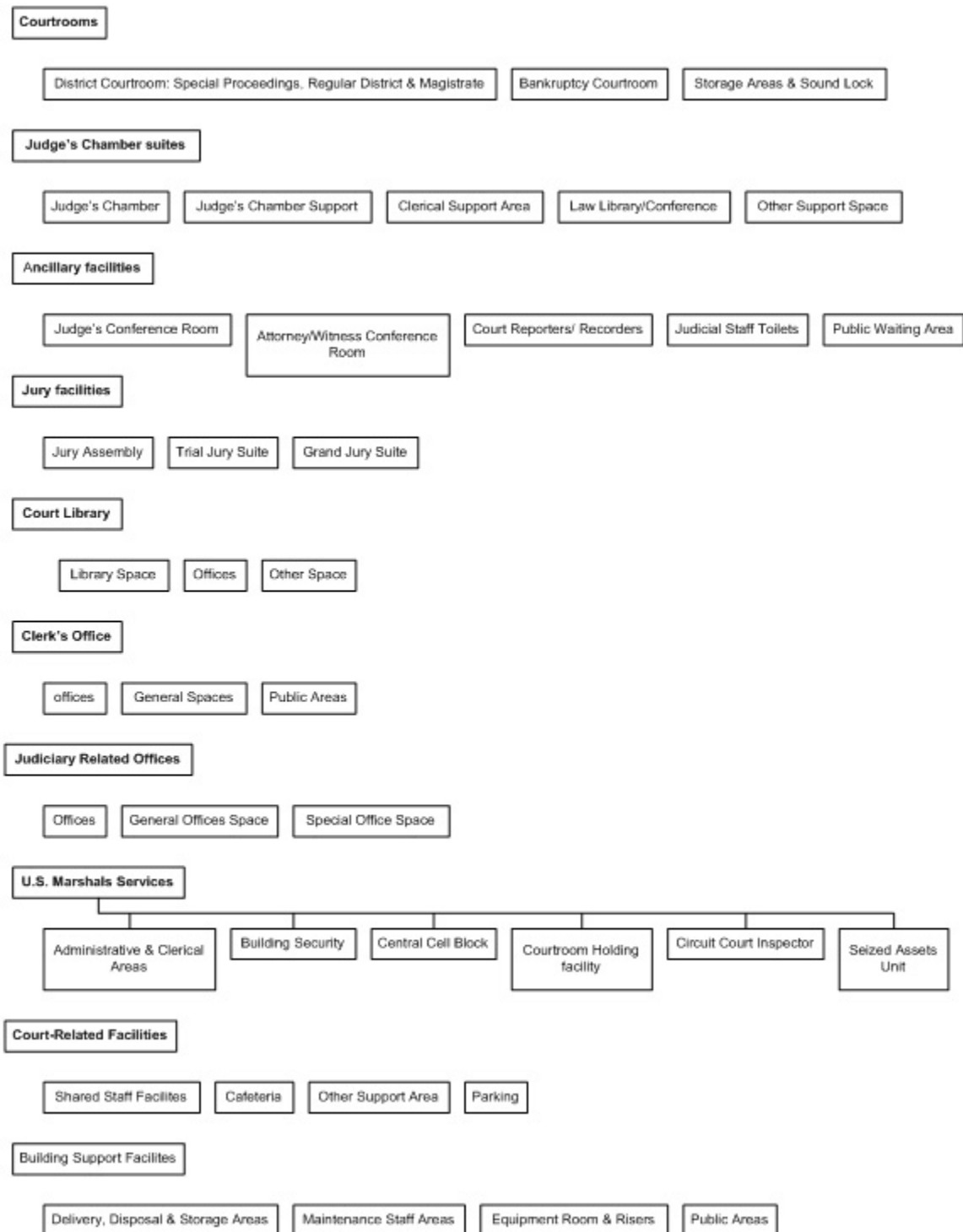


Figure 3-2 courthouse functions as defined by the U.S. Design Guide 1997

Hardenbergh et. al. (1998) treated the courtroom as the focal point of the courthouse with the following support activities: judges' chambers and their support functions; jury operations including jury assembly, jury deliberation and grand jury operations; security and prisoner detention including central holding areas and courtroom holding areas; general facility support; court administration and clerk of court; court-related agencies; and building support functions (Figure 3-3).

Philips & Creibel (2003) identified adjudication spaces as the courtroom, judges' chambers and their judicial staff; jury assembly and jury deliberation rooms, grand jury room, conference areas; work processing areas such as the clerk of the court office; customer service areas that include corridors, queuing areas and waiting areas, court support spaces that include offices for prosecutors and defenders, probation, prisoner holding, and building control center (Figure 3-4).

Thus, the three documents vary slightly in the manner in which they group the accommodation of the various functions that are housed in a courthouse building while agreeing that the courtroom, the judges' suites, the jury suite, and the prisoner holding areas are major and distinct components of the program. In order to better make sense of the programmatic requirements, Greenberg's (1975) classification of courthouse functions is helpful.

Greenberg distinguished between two kinds of functions: these that are directly associated with courtroom operation and those associated with administrations and public services. The former include judge's chambers, direct judicial support functions, such as judicial assistants or secretaries, law clerks, and court reporters, hearing rooms, jury deliberation rooms, attorney/client conference rooms, and the law library. They also include courtroom-holding facilities and public waiting areas. The later include the clerk of court offices, various governmental agencies and public functions such as the cafeterias.

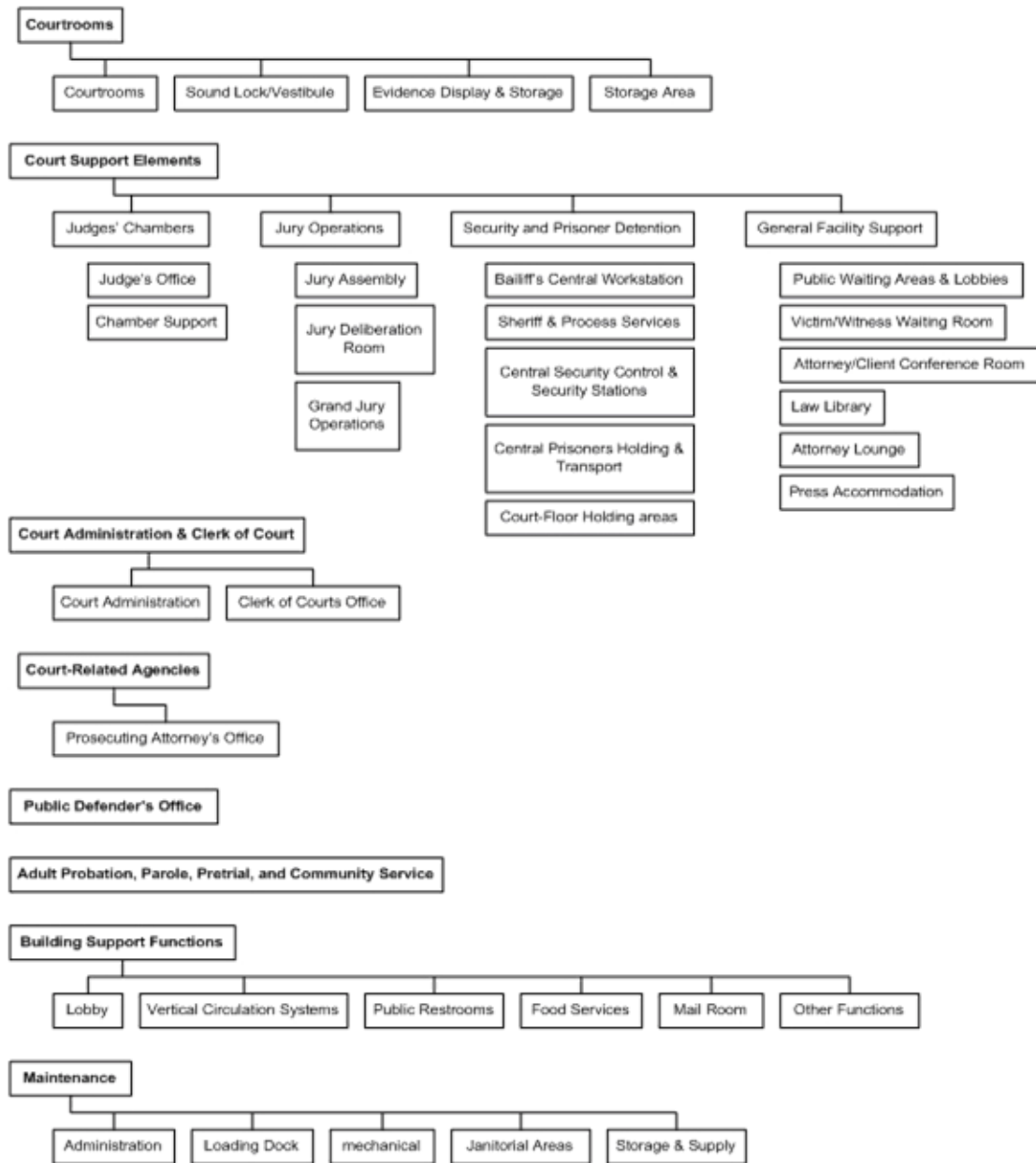


Figure 3-3 Courthouse Functions as identified by Hardenbergh et. al. (1998)



Figure 3-4 Courthouse Functions as identified by Philips & Creibel (2003)

Functions directly associated with the courtroom are labeled ‘low volume’ functions, while administrative and social services are labeled ‘high volume’ functions (Hardenbergh et al. 1998; Philips and Creibel. 2003). *The U.S. Courts Design Guide* (1997) along with Hardenbergh et al. (1998) and Philips & Creibel (2003) encourage the separation of high volume functions from low volume functions. High volume functions should be located on the entry floor or lower floors to be as accessible as possible to the public. Low volume functions should be located on higher floors to enhance security.

The key functions associated with the operation of the courtroom will be discussed in more detail because they are central to the courthouse building as a whole. Other functions, specifically the ones that might be located in, adjacent to or near a courthouse building, but not defined by the design guides being directly linked to the courtroom operations, which include district attorney, public defender, county law library or probation department will not be discussed in similar detail.

3.4.1 The Courtroom

According to the State of California Task Force on Court Facilities (1999, p III-2), the courtroom “*provides the formal setting for conducting the business of the court.*” It represents an interface zone where all the parties related to the judicial process come together in one space; it accommodates the judge, hearing officer (judicial officer), court clerk, reporter, bailiff, attorneys and defendants-in-custody, witnesses, jury, and spectators.

Functionally, the courtroom is divided into two zones: the spectator area and the litigation area. The spectator area provides seating for families, witnesses, and the public. The usual number of seating in this area varies to an extent from 20 to 25 seats in a non-jury courtroom to around 100 to 150 seats in large courtrooms (Hardenbergh et al., 1998). The litigation area provides seating for the primary participants in the judicial activity: judge’s bench, courtroom clerk station, court reporter’s area, bailiff’s station, witness stand, jury box, counsel area, and exhibition display area and equipment (Figure 3-5). In

the case of criminal courtrooms, four or more separate and distinct entry points should be provided; a single public entry point from the public zone through a vestibule or a sound lock area, an entry point for the judge, one or more entry point for the judicial officers, jurors, court personnel from the restricted circulation system, and a secured entry point for defendants in custody from the secure circulation system. Usually a wooden railing in a manner that controls movement of the public separates the spectator area and the litigation area.

Courtrooms in a courthouse building vary in their size and number depending on the type of proceedings that take place within them (Philips & Creibel, 2003); within the federal trial courts system, trial proceedings are both criminal and civil. Some of these proceedings require juries while others don't. These proceedings take place in two different types of courtrooms: district courtrooms²¹ that deal mainly with criminal proceedings and bankruptcy courtrooms that mainly deal with civil cases. A generic courtroom dealing with criminal proceedings for instance require place for jury members, while other proceedings may not require courtrooms with jury tiers. The traditional courtroom is rectangular and deeper more than it is wide²². As for the height of the courtroom, it also varies in accordance with the type and size of the courtroom. Table 1 shows the areas and heights of different courtrooms as specified U.S. Design Guide (1997).

According to the (Hardenbergh et. al. (1998) and the State of California Task Force on Court Facilities (1999), in multilevel structures, courtrooms dealing with criminal proceedings should be located on upper floors on less trafficked areas, while Bankruptcy courtrooms and Special proceeding courtrooms can be located on lower floors.

It should be noted that courtrooms have additional spaces adjacent to them supporting their operation during trial proceedings. These spaces include equipment

²¹ District courtrooms can be divided into three types: special proceeding courtrooms, regular district courtrooms, and magistrate courtrooms.

²² Modern courtrooms can also be round, circular, or square.

storage areas and short term exhibit storage space. The area of these spaces is determined according to the need of each individual courtroom.

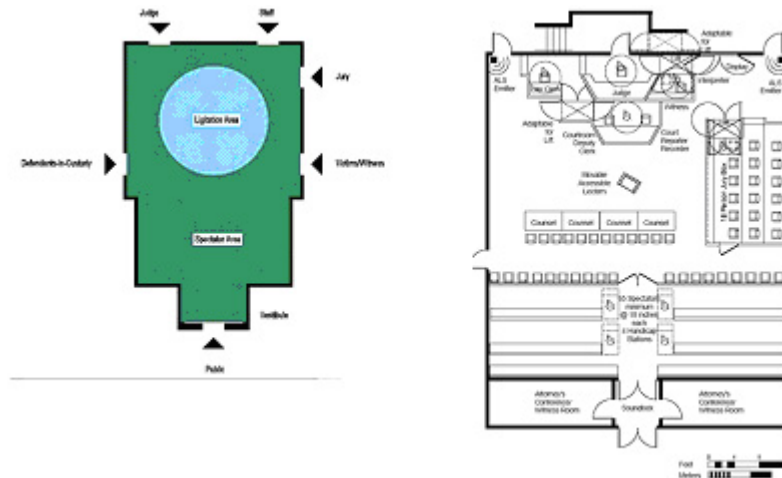


Figure 3-5 the left illustration shows functional separation of the courtroom with various entrances, while the right illustration shows a typical layout of regular district courtroom from the U.S. Courts Design Guide (1997)

Table 3-1 Areas of different types of courtrooms as given by the U.S. Design Guide (1997)

Courtroom	U.S. Design Guide	
U.S. District Court Special Proceeding Courtroom	Area (N.S.F)	Height (Ft)
	3,000	18'-0"
U.S. District Court Regular Courtroom	2400	16'-0"
U.S. Magistrate Judge Courtroom	1,500	14'-0"
U.S. Bankruptcy Courtroom	1,800	16'-0"

3.4.2 The Judge's Chambers Suite

The judge's chamber is the place where the judge spends his/her time when not at the bench. The size and functions located within the judge's chamber depend on status of the judge, whether a district judge or a magistrate judge, as well as the type and size of

the courthouse. According to the guidelines a generic chamber comprises the following functions (Figure 3-6):

- 1) The judge's private office where the judge spends his private time. The judge's office should have a separate private entrance connecting him/her to a private circulation corridor along with a private restroom and a private closet.
- 2) Chamber support and judicial support. The judicial support spaces consist of the following: A secretary/receptionist area with an adjoining lounge for public waiting; a law clerk area/ work station. This area is designated to a law clerk. The law clerk is usually a research attorney that reviews case files and perform legal search for the judge. These workstations can be either provided commonly or the workstation can be located within the judge's chamber.
- 3) Conference room/law library: This area has a conference table and bookshelves to house reference material. This area can be provided individually for each judge's chamber or it can be centrally provided for a group of judges.
- 4) Copy/fax/supply area: This area contains photocopy and facsimile machines that are accessible to judicial officers. It should be noted that such an area can be provided for each judge separately or it can be commonly provided for more than one judge.
- 5) Minute and scheduling clerk area: this area is designated to the minute clerk is responsible for preparing the calendar for the judge and assisting the secretary. The clerk may be stationed in the judge's chamber or grouped centrally with other clerks.
- 6) Bailiff work area: this area is designated to the bailiff is responsible for the security of the judge and can be either located in the judge's chamber or with other bailiffs.

The judge's chamber is accessed from a private/restricted corridor. It should be noted that it is recommended that the judge's chambers should have, according to guidelines, two separate entrances; a private entrance for the use of the judge directly linking the judge's

private chamber to the private corridor and an entrance from the private corridor to a reception area overlooked by the secretary for the all other groups.

Each judge can be assigned his/her own courtroom or can rotate to different courtrooms. The judge's chambers can be either grouped together on collegial floor, or they can be located on the same floors as the courtrooms on non-collegial floors. In the case of collegial floors, judges are provided with a conference room and a robbing area on the same floor as the courtroom where hearing take place.

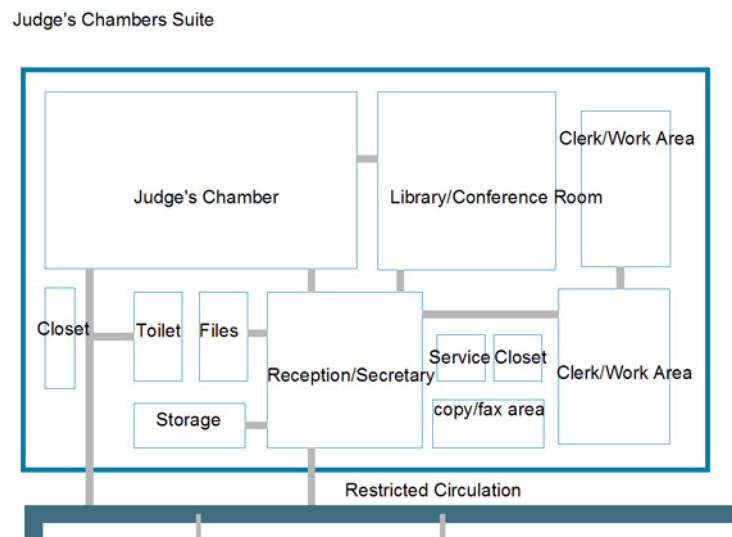


Figure 3-6 a non-metric diagram of the functions within a judge's chamber suite. The specific location of each function is not fixed and left to design considerations. (Source: Author's drawings based on the design Guide requirements.

Table 3-2 areas in NSF of different functions located within the judge's chamber (source: U.S. Courts Design Guide)

Courtroom	Judge's Chambers	Library/Conference	Secretary	Rec.	Law Clerk	St.	Copier/Fax/Service Unit/Coat CL.	Vest/CL	Toilet	files
U.S.D.C. Special Proceeding Courtroom	500	400	120	100	2x 150	80	50/10/20/10	50/10	50	140
U.S.D.C. Regular Courtroom	500	400	120	100	2x 150	80	50/10/20/10	50/10	50	140
U.S.D.C. Magistrate Courtroom	400	300	120	100	150	80	50/10/20/10	50/10	50	60
U.S.D.C. Bankruptcy Courtroom	400	300	120	100	150	80	50/10/20/10	50/10	50	60

3.4.3 Ancillary functions

A number of ancillary functions are necessary for the functioning of the courtroom. For the District Magistrate, and Bankruptcy courtrooms, these functions are:

- 1) Common Judge's conference room: this area is for conferencing. The area is 25 NSF/judge or 150 NSF minimum. Adjacent to the conference room is a service unit with the area of 20-100 NSF. This area is accessed via a restricted circulation system and can be found on either collegial or non-collegial floors.
- 2) Attorney conference/witness waiting room: this area is where attorneys meet with their clients or where witnesses wait for their turn to testify in trial proceedings. Two rooms are provided for each courtroom with an area of 150 NSF each. This area is directly adjacent to the courtroom and is accessed via public circulation system or courtroom's sound lock.
- 3) Public waiting area: this area is designated for the public waiting for a trial proceeding. It is located outside the courtroom and accessed via public circulation system.

- 4) News media room: this is an optional area is for media reporters. The area is 150 NSF minimum. Its location is not specific with relation to the courtroom and can be accessed via the public circulation system.
- 5) Judicial staff toilets: this is the restroom area provided as required in each individual design case. The minimum requirements are two restrooms with 50 NSF each. It is accessed via the restricted circulation system.
- 6) Court reporters' work area: This is area is where the reporter transcribes court proceedings and review transcripts. This area comprises the following functions:
 - a) Court reporter/Recorder office: the area for this space is 150 NSF. Adjacent to this area is storage area of 50 NSF.
 - b) Shared work room: this area is 100 NSF and is located near the reporter's space.
 - c) Transcriber/Typist workstation: this area is 50 NSF and located near the rep/rec.'s space.

The public waiting area and the news media room are accessed via the public circulation system, while the judicial staff toilets and the court reporter's work area is accessed via the private circulation system. Each of the above mentioned functions are located on the same floor as the courtroom except for the news media room that can central to the courthouse building as a whole. In the case of collegial floors, the court reporter's work area is moved to the same floor as the judge's chamber suites and is not on the same floor as the courtrooms.

3.4.4 Jury Deliberation Suite

Within the courthouse building, there are three spaces assigned to the jury: the first is the jury assembly room where jurors are gathered for orientation once they have been called to perform their duty. The second is the grand jury room, and the third is the jury deliberation suite. The first and second jury functions are considered a part of the 'high volume' functions and thus located on lower floors. Jury deliberation rooms are directly associated to the functioning of the courtroom, and as such, are located on courtroom floors.

The Jury deliberation room is the place where jury members conduct their discussions to decide about a case. As such, guidelines recommend that the room should be free from distractions and outside interference. The size of the jury room depends on the jury members' number. In the case of a 6-person trial jury, the area of the deliberation room is 250 NSF, while in the case of a 12-person jury trial, the area is 350 NSF. Within the jury deliberation suite, there should be a sound lock area of 50 NSF, a jury custodian area of 50 NSF, two separate restrooms (male/female) of 50 NSF each, a service area of 20 NSF, video and exhibit equipment area of 10 NSF, and a coat closet of 20 NSF (Figure 3-7).

The jury deliberation suite has a controlled access via the jury custodian and can be accessed via the public or private circulation system. The jury deliberation suite is located on the same floor as the courtroom.

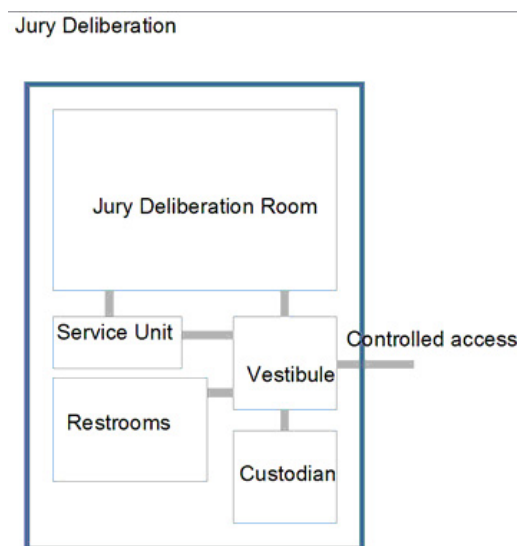


Figure 3-7 a non-metric diagram of the functions of the jury deliberation suite. (Source: Author's adaptation of Hardenberg et. al. 1998)

3.4.5 Defendant-in-Custody Courtroom Floor holding Area

In multi-story courthouses, defendants-in-custody are brought in through a central facility controlled by the U.S. Marshals office. Waiting for trial proceedings, defendants-in-custody are held in holding sets that are located between courtrooms. The holding area is usually shared between two courtrooms where the courtroom layout, function and security requirements determine proper displacement. The holding area is made up of secure elevator/stair as required, controlled circulation with 5 ft minimum width, the minimum of two holding sets at 90 NSF each, and a two courtroom sound locks at 40 NSF each. A guard supervision area may be provided. This secure holding area is directly adjacent to the courtroom via the sound lock area and only accessible to the U.S. Marshals personnel via secured corridors, stairs, and elevators (Figure 3-8).

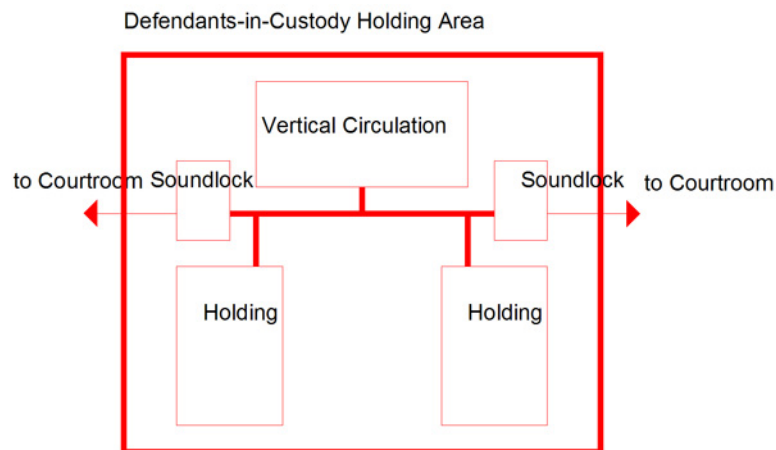


Figure 3-8 a non-metric diagram of courtroom floor holding area. (Source: Author's adaptation of Hardenberg et. al. 1998)

The functions mentioned above constitute the spatial building blocks of the courthouse building that have a direct effect on the form of the courthouse building. These functions can be grouped together into functional subsystems. Furthermore, in order to manage the flow of people in the courthouse and to ensure the proper functioning and conduct of operations, the functions of the courthouse building are organized into

four primary zones (Hardenbergh et. al. 1998, Philips & Creibel, 2003), each of which is supported service areas, mechanical and service cores, computer rooms, storage, and of course, vertical circulation cores. These zones are accessed and conditionally linked with each other by different circulation systems. In the next section the zones and circulation systems will be described in greater detail. In this way the rather itemized look at the program that was offered in this section will be complemented by a more global look into the way in which the functional building blocks are assembled into larger spatial complexes.

3.5 Functional Zones and circulation systems

To insure the proper functioning of the courthouse, the above mentioned functions are grouped into four basic zones:

The public zone includes all the areas accessible to general public along with attorneys, clients, witnesses and jurors such as a central public hall, circulation corridors and waiting areas serving the courtrooms, restrooms, snack bars, etc...

The private/restricted zone includes all the functions that have a restricted access and are used by particular courthouse users such as judges, jurors, and employees. This zone can be accessed by the public upon invitation and access permission is required. It has both high volume functions such as departmental offices that interact with public over counters which are located on lower floors and low volume functions such as judge's chambers and their support staff which are located on upper floors.

The secure zone is provided for the temporary holding and movement of defendants in custody. It includes the horizontal and vertical circulation system as well as holding areas. It begins with secure sally port usually located in the basement, a central holding and distribution area that is located on lower floors, and holding sets exactly adjacent to courtrooms on courtroom floors to hold defendants-in-custody during trials' proceedings.

The interface zone is where the public, private, and secure zones interact and converge i.e. the courtroom. In this zone, all the participating parties in the adjudication process come together; public, judge, attorneys, jurors, and defendants-in-custody. As such, the courtroom can be regarded as the heart of the courthouse building. Courtrooms tend to be located on the upper floors of courthouse buildings.

Table (3-3) shows how the different functions mentioned earlier are distributed into the four zones of the courthouse building. In order to differentiate between the zones, a color code is used: the private zone is blue, the public zone is yellow, the secure zone is red, and the interface zone where all the parties involved in the trial proceedings come together is green. Because the private zone consists of discrete functional units, different shades of blue are used to mark the different functions in that zone.

Table 3-3 the generic functions that are directly associated with functioning of the courtroom distributed into the four zones.

Guard/s Area (optional)		
Sound lock	Functional Subsystems	
Secure Staircase/Elevator		
Courtroom	Courtroom	Interface Zone
Public waiting areas	Public Area	Public Zone
Public restrooms	Attorney/Client Conference	
Judge's Chamber	Judge's Chamber Suite	Private Zone
Reception/Secretary		
Clerk/s Work Area		
Storage/copy/fax/closets		
Judge's Private Toilet		
Library/conference (optional)		
Court reporter's	Courtroom Support	
Bailiff workstation		
Research attorney offices/workstations		
Shared Fax/Record storage/Copying		
Witness Waiting Area	Witness Waiting Area	
Robbing/conference room	Robbing/conference room	
Jury Deliberation Room	Jury Deliberation Suite	
Jury Custodian		
Cloak/Toilets/Service Unit		
Sound lock		
Storage/ electrical/mechanical	Services	
Courtroom Holding Sets	Defendants-in-custody Holding Area	Secure Zone

According to Philips and Creibel (2003), the separation of the functions of the courthouse buildings into distinctive zones and the separation of the circulation system into several distinct sub-systems that connect these zones together are the central organizing principles in the planning and design of courthouses. The different circulation systems that connect and serve the zones will be discussed next.

Contemporary courthouses are designed with three distinctive types of circulation following the three distinctive groups that use the courthouse: the general public, defendants-in-custody, and judicial staff that include judges, staff, and jurors. The public is comprises a large number of persons who infrequently visit the courthouse as witnesses, litigants, and spectators. The three circulation systems are separate until they are joined together in the courtroom. Prior to the 1950, judges, jurors and the public used the same public spaces (Greenberg, 1975). But due to the requirements of efficiency, convenience, and security, segregated circulation systems are provided both vertically and horizontally. Figure 3-9 shows these three types of circulation.

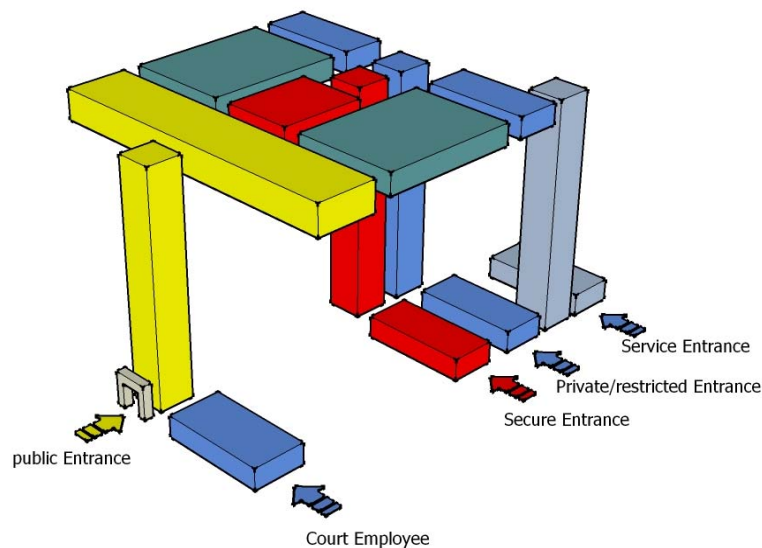


Figure 3-9 the three circulation systems in the courthouse building as recommended by the U.S. Court Design Guide (Source: Adopted by author from the U.S. Design Guide, 1997)

The public circulation system is an unrestricted circulation system dedicated to the general public. All functions that have a public service counter or reception should be accessible from the public circulation zone. These functions include the courtrooms, public counter areas, public waiting areas, public restrooms, public elevators, and other public reception areas (State of California Task Force on Court Facilities, 1999). This system comprises horizontal elements such as corridors or hallways and vertical elements such as elevators, escalators and staircases connecting the main entrance and lobby areas, public service areas, and public hallways. Access to public circulation system is through a main entry point passing through a security screening checkpoint. A controlled point of access/connection between the public system and the restricted circulation system is provided and is monitored by a receptionist in order to control access and maintain security (Greenberg, 1975). This point marks what can be called controlled circulation system that provides attorneys and members of the public with access to the judges' chambers in case they have an appointment.

The restricted/private circulation system is labeled differently in different guidelines e.g. 'private' in the Task Force for California Court Facilities (1999), 'secure' in others. This thesis will use the term restricted to refer to this system. This system provides “...*limited access corridors between specific functions to court staff, judicial officers, escorted jurors and security personnel.*” (State of California Task Force on Court Facilities, 1999, p ii-4). These corridors connect courtrooms, support staff areas, jury deliberation rooms and authorized staff parking areas i.e. people who can use this circulation system are limited to judges, jurors, and staff, authorized personal, and invited guests (Philips & Creibel, 2003). Building service functions such as storage are also located in this area. Thus, the judges, staff and the jurors have their own circulation system at the back of the courtrooms to access the different functions related to their practices (Greenberg, 1975). This circulation system is restricted to the general public but not entirely dedicated to the judicial personnel.

The secure/defendants-in-custody System is completely separated from public and restricted circulation systems. It includes a 'secure' vertical and horizontal circulation

system that connects the vehicular sally port, the central holding area, attorney interview rooms, and the holding areas adjacent to the courtrooms. This circulation system is controlled and supervised by the U. S. Marshals Services (State of California Task Force on Court Facilities, 1999). Furthermore, the secure circulation system does not intersect with either the public or the restricted circulation systems. The public and restricted circulation systems intersect under highly controlled conditions: the public, are allowed into the restricted circulation system upon permission or by appointment.

These circulation systems allow the functional zones to retain their autonomy within the overall plan. Thus, Figure 3-10 shows the different functions grouped into zones and connected by different circulation systems as recommended by the *U.S. Courts Design Guide*. This graphical representation can be referred to as the courtroom set.^{23,24} Other graphical representations showing the functional subsystems and components of the courtroom set can be found within different guidelines (Figure 3-11). Nevertheless, all these representations share the same underlying functional relationships, zoning and circulation separation.

The requirements of zoning and differentiated circulation systems highly constrain the spatial planning of courthouse buildings. Should we therefore presume that all courthouse buildings therefore have the same plan, or plans which sustain exactly the same relationships of adjacency or connectivity between the component functions? In the next section a more systematic analysis will be used in order to test whether the functional requirements expressed in the design guides result in plans with the same spatial structure. Thus, the next section complements the one just completed by looking

²³ It should be noted the sets of activities included within the functional set vary depending on the type of the court being designed; some courtrooms don't require jury deliberation rooms or detainee holding areas, others may not have the supporting activities or the judges' chamber on the same floor, others may not require witness waiting area. In any case, the functional section forms the basic unit in the spatial layout of courthouse design. It should be noted that the functional diagram representing the spatial layout presented here is not fixed and varies according to the type of courthouse it represents. Furthermore, the exact configuration of sets of activities is not determined exactly, thus, sets of activities can be located differently with relation to the courtroom but any other configuration will have to maintain the overall spatial relationship within its component sets. Nevertheless, this configuration represents a prototypical courthouse functional section.

²⁴ Philips and Creibel (2003) refer to the combination of two courtrooms with their supporting functions as the courtroom set.

at the objective manifestations of planning requirements in the plan of a sample of courthouse buildings. The sample is drawn from the unique data-base assembled at the Georgia Institute of Technology under a research program funded by the GSA. The analysis reported here is original and an integral part of this thesis. The case studies are selected from the GSA's Courthouse Management Group (CMG) CD-ROM third edition. The CD-ROM contains IPIX photographs of the courthouses built between 1989 and 1996 as well as background information about each courthouse and building drawings where available.

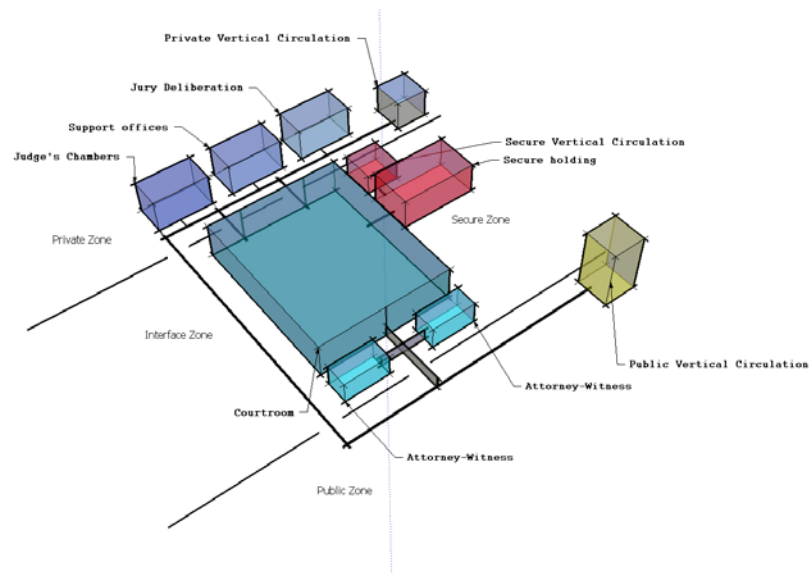


Figure 3-10 the courtroom functional set (Source: Author)

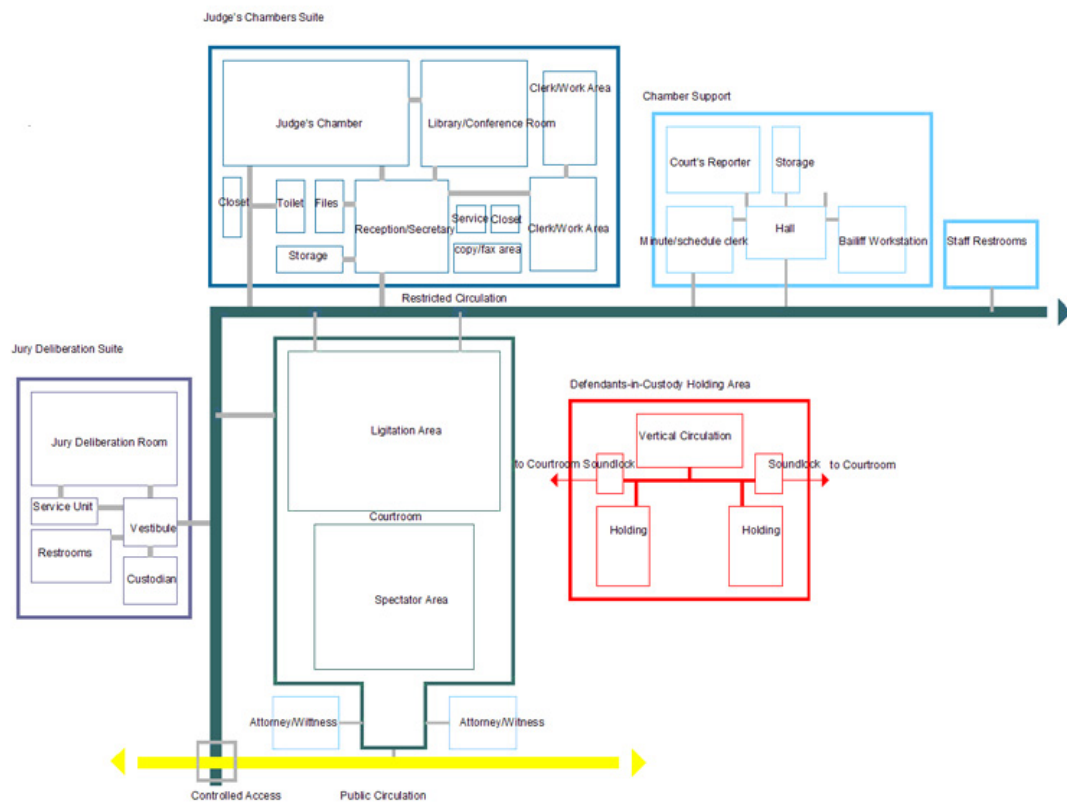


Figure 3-11 the courtroom functional set divided into functional activities (Source: Author)

3.6 Connectivity Graphs and Functional Genotypes of Courthouse Buildings

March and Steadman (1971) have suggested that the spatial relationships constructed by building plans can be represented as graphs, whose nodes represent rooms or spaces, and whose arcs represent relationships of adjacency or permeability between spaces. In a well known diagram using three plans by Frank Lloyd Wright they have shown that one of the uses of such graph-representations of plans is to reveal underlying patterns of relationships which transcend evident and striking differences in geometry. Thus, three houses plans according to a rectangular lattice, a triangular lattice and a pattern of intersecting circles all display the same underlying set of relationships between the functional spaces. By implication, graph analysis can serve to capture the functional spatial structures that underpin building design. In the words of the authors “*Objects which appear to be very dissimilar on first acquaintance may be seen, later, to share an underlying structural pattern.*” (March & Steadman, 1971, p. 27).

This idea has been taken up by Hillier and Hanson (1984). They have proposed that the stable patterns of relationships which characterize otherwise diverse plans and forms are genotypical in that they bear on the relationship between the principles that govern building design and the principles that govern the social relationships and patterns of behavior accommodated within the plan. In Hillier and Hanson’s (1984) work, the idea of “stable relationships” can become quite abstract. Thus, the stability they are interested in does not consist in the repetition of the exact same graph of connections under different plan geometries, as with the example of Frank Lloyd Wright houses used by March and Steadman (1971). Rather, Hillier and Hanson (1984) point to the stability of the rank order of the different nodes of the graph based on a measure of access. The measure in question is widely known as “closeness-centrality” and describes the minimum number of intervening nodes that must be crossed to reach from one node of the graph to all others. However, in the work of Hillier and Hanson, “closeness-centrality” is called “integration”. Nodes of the graph from which other nodes are more easily accessible are more integrated. The domestic genotypes identified by the authors are stable inequalities

between the integration values of different function spaces such as the “living room”, the “kitchen” and the “bedroom”.

In the analysis that follows, graphs will be used to represent the essential relationships which are prescribed in design guides (for example Figure 3-10 and 3-11 above) as well as the actual relationships realized in courthouse buildings designed under the purview of these guides. The aim of the analysis is to test whether the requirements of zoning and differentiated circulation result in stable graphs or in stable “genotypes” in the sense in which the term is used by Hillier and Hanson (1984).

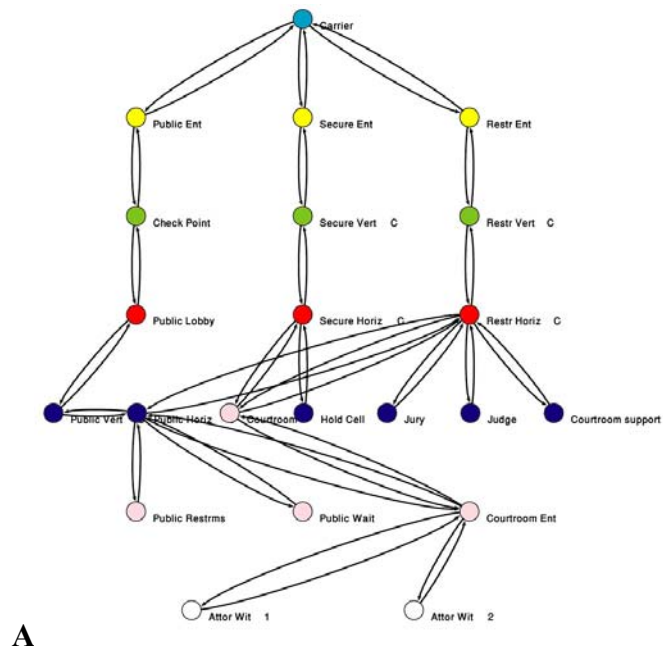
Figure (3-13a) depicts the relations between the functions of the courtroom floor and the various circulation systems and the external world as described in the *US Courts Design Guide* (1997). It contains the following nodes: carrier or external world, public entrance, public check point, courthouse lobby, public vertical circulation on entry floor, public horizontal circulation on courtroom floor, public waiting area, public restrooms, courtroom vestibule, attorney/witness 1, attorney witness 2, courtroom, restricted/private entrance, restricted vertical circulation, restricted horizontal circulation, judge’s chambers, jury deliberation room, courtroom support functions, secure entrance, secure vertical circulation, secure horizontal circulation, secure holding areas. The graph is arranged so that nodes are aligned according to the number of steps needed to reach them from the carrier. It was produced using “Pajek 1.10”, software for graph analysis developed by Vladimir Batagelj and Andrej Mrvar and freely available on the web (<http://vlado.fmf.uni-lj.si/pub/networks/pajek/>).

Figure (3-13b) shows only the main functional components specific to the courtroom floor set. These functions include: public horizontal circulation on courtroom floor, public waiting area, public restrooms, courtroom vestibule, attorney/witness 1, attorney witness 2, courtroom, restricted horizontal circulation, judge’s chambers, jury deliberation room, courtroom support functions, secure horizontal circulation, and secure holding areas. In this case, spaces are arranged according to their closeness to the main public circulation system.

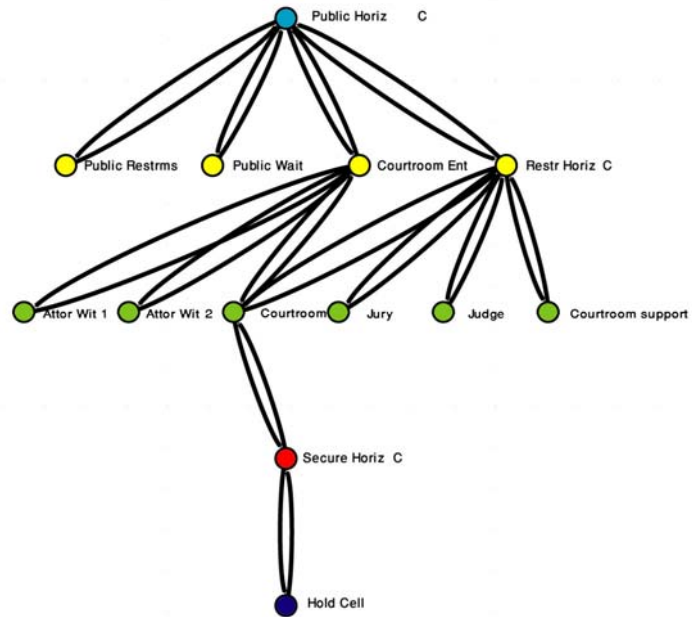
The question to be examined next is the extent to which these graphs are realized in actual courthouse buildings. The 25 buildings included in the analysis were chosen according to the availability of full architectural plans. They are designed by different architects in different styles over a period of fifteen years in different parts of the United States of America. Islip is, of course, included in this sample. For security concerns, neither architectural representations i.e. plans nor images or names of courthouses will be declared; rather, only blurred images will be shown to support the arguments of the thesis.

Of the 25 courthouses, 15, including Islip, conform to the graph shown in Figure 3-13b. The remaining 9 courthouses are described by 6 different graphs. The set of graphs is shown in Figure 3-14. Graph A in figure 3-14 represents the generic graph in figure 3-13b where 16 courthouse prescribe to it, graph B has three cases prescribing to it, graph D and E have two courthouse prescribing to each, while the rest of the graphs have only one courthouse prescribing to each of them. There are two conclusions that follow from Figure 3-14: first, the set of relationships prescribed in the design guide are not universally adhered to by all realized designs. More than a third of the sample deviates in some respect from the prescription. Second, The Islip Courthouse building is among the majority of buildings that fully conform to the prescription.

The results of the analysis are probed further by looking into the order of integration of the various spaces. This is given in Table 4, which arranges spaces in descending order of integration from left to right. Of course, only the 16 court buildings with identical graphs display the exact same overall order of integration. However, a better understanding can be gleaned by looking at two different subsets of spaces, circulation spaces on the one hand, and main use spaces on the other.



A



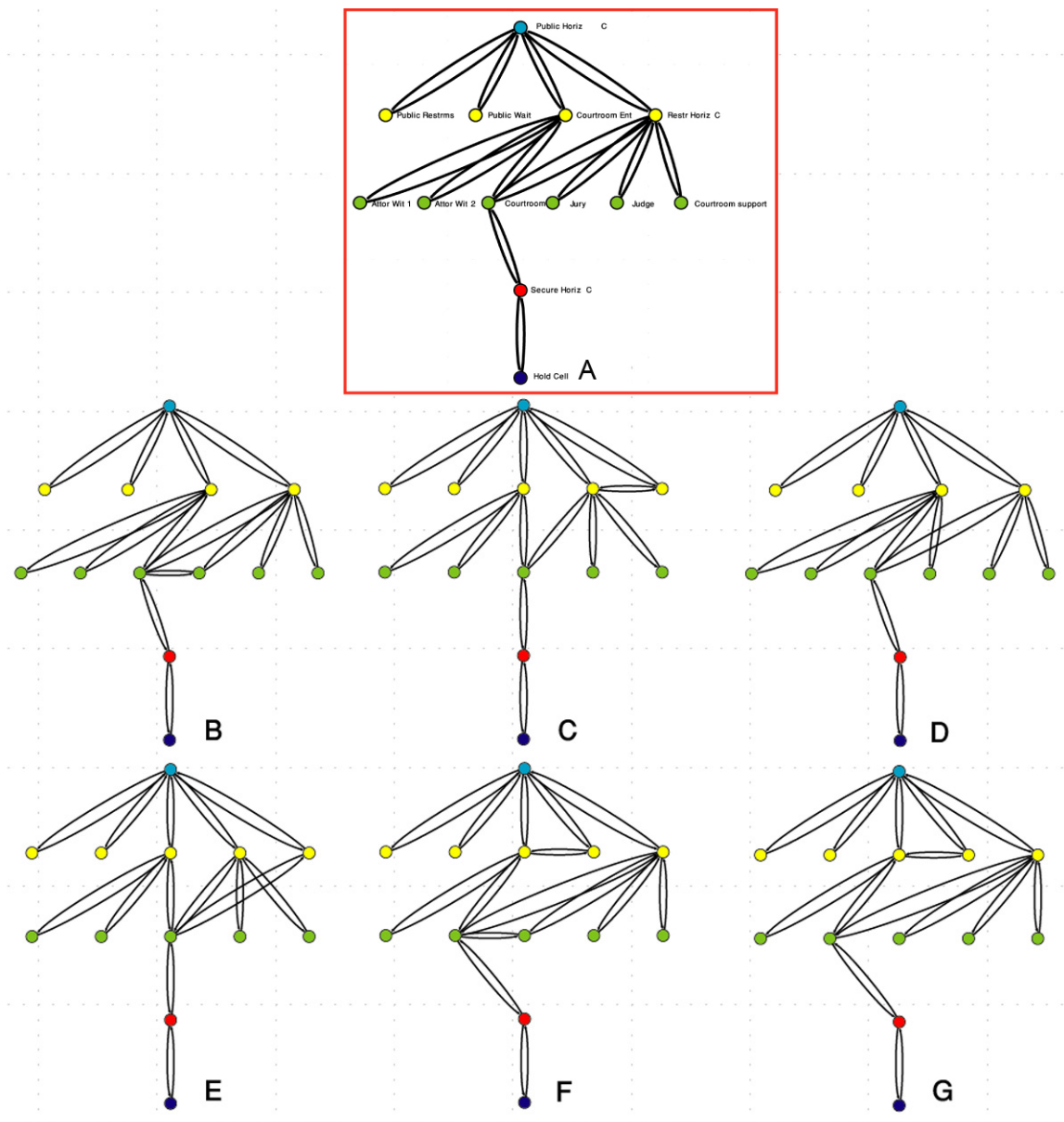
B

Figure 3-13 graph A depicts the relationships of connectivity between courtroom set, circulation systems and external world as prescribed in the US Court Design Guide, 1997. Graph B depicts the relationships of connectivity between the functions on courtroom floors (Source: Author)

Circulation will be discussed first. In 20 out of 25 cases the order of integration of circulation spaces is: Restricted Horizontal>Public Horizontal>Secure Horizontal. In the remaining 5 cases the order changes to: Public Horizontal>Restricted Horizontal>Secure Horizontal. Thus, the stability of relationships between circulation spaces is greater than the stability of the graph as a whole. The secure circulation, devoted to defendants in custody, is always the most segregated part of the circulation system. The circulation systems devoted to the public and the judicial staff do not have a stable relationship. There is, however, a very strong tendency for the circulation corresponding to the judicial staff to be the integration core of the building. Most courthouses, therefore, are inhabitant-center buildings, if we follow Hillier and Hanson (1984) in calling “inhabitants” those who are in charge of the social knowledge that governs building function.

Turning to use spaces, we observe that the order of integration: courtroom>jury deliberation room>judge’s chambers>secure area is stable across all 25 court buildings. Other use spaces, and most notably those associated with the attorneys, have shifting positions. The attorney witness conference room is entered either from the courtroom vestibule in most cases, or directly through the public horizontal circulation (in three cases).

To summarize, court buildings do not universally replicate the patterns of connectivity prescribed in the *US Court Design Guide* (1997). However, there is a universal inequality genotype governing the relationship of main use spaces other than those associated with the attorneys. Furthermore, there is a very strong genotypical tendency regarding the pattern of circulation. Thus, it becomes quite evident that the restrictions imposed by the program and the guides are inscribed in the spatial structure of courthouse buildings. In the next section we ask how the genotypical trends identified here are realized in the same or in different geometrical arrangements. Thus, the analysis gradually moves from the more abstract properties of spatial structure to the more immediate properties of the plan.



**Figure 3-14 graphs representing connectivity relationships realized in a sample of 25 court buildings
(Source: Author)**

Table 3-4 Rank order of Integration of spaces in sample of court buildings

16 Courts	R. H. Cir	P. H. Cir	C.	C. Ent.	S. H. Cir.	J. D. R.	J. Ch.	C. S. F.	P. Rest	P. W.	A/W 1	A/W 2	S. H. A.
N. Y. and A.	C. Ent.	P. H. Cir	C.	R. H. Cir	S. H. Cir.	A/W 1	A/W 2	J. D. R.	P. Rest	P. W.	J. Ch.	C. S. F.	S. H. A.
O & S	P. H. Cir	C.	C. Ent.	R. H. Cir	J. D. R.	S. H. Cir.	P. Rest	P. W.	A/W 1	A/W 2	J. Ch.	C. S. F.	S. H. A.
K	P. H. Cir	R. H. Cir	C. Ent.	C.	J. D. R.	S. H. Cir.	P. Rest	P. W.	J. Ch.	C. S. F.	A/W 1	A/W 2	S. H. A.
Ch & Co	C.	R. H. Cir	P. H. Cir	C. Ent.	J. D. R.	S. H. Cir.	J. Ch.	C. S. F.	P. Rest	P. W.	A/W 1	A/W 2	S. H. A.
Sc	R. H. Cir	P. H. Cir	C.	C. Ent.	J. D. R.	A/W 1	S. H. Cir.	J. Ch.	C. S. F.	P. Rest	P. W.	A/W 2	S. H. A.
Ta	R. H. Cir	P. H. Cir	C.	C. Ent.	A/W 1	S. H. Cir.	J. D. R.	J. Ch.	C. S. F.	P. Rest	P. W.	A/W 2	S. H. A.

3.7 The geometries of genotypical relationships: functional diagrams

The diagram presented in Figure 3-15 realizes all the spatial relationships described in the graph shown in Figure 3-13, as is taken from the US Courts Design Guide (1997). However, these relationships are realized through the arrangement of spatial units with dimensions and areas. Thus, the diagram is closer to an actual architectural plan and expresses programmatic requirements in a way which is more directly relevant to a designer. Indeed, designers rarely represent their buildings as graphs, but often work in diagrams. As White (1972) stated, “*it is of value to express as much of the program [of the courthouse] graphically and diagrammatically as possible...as diagrams have direct implications on physical building form*”. Here the term “functional diagram” will be used in order to describe the geometrical arrangements in which a given pattern of connections is realized. Functional diagrams are in this sense similar to what Alexander (1967) has described as constructive diagrams. They can be interpreted as an interpretation of the program which could assist the future derivation of design form. However, most of the functional diagrams discussed here are not starting points for the design of new buildings, but rather abstractions from already existing designs. Thus, functional diagrams, as used here, serve an analytic not a synthetic purpose.

In order to compare the plans of actual buildings to this diagram, the plans themselves were diagrammatically represented, as shown in Figure 3-16. Based on these diagrammatic plans, the functional diagrams representing courtroom sets were singled out, as shown in Figure 3-17. The courtroom set diagrams in Figure 3-17 are directly comparable to the diagram shown in Figure 3-16.

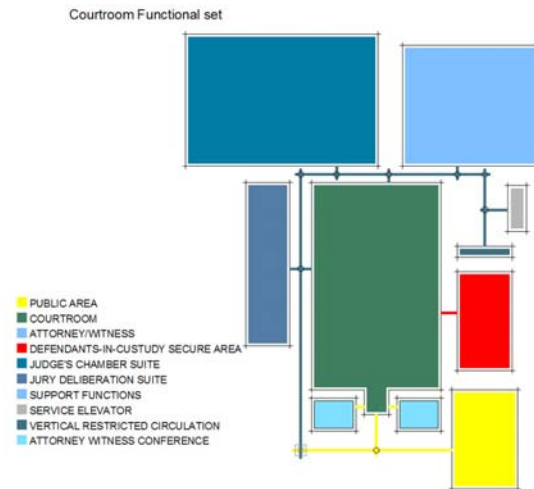


Figure 3-15 a functional diagram of the courtroom functional set (Source: Author)

In the analysis that follows it is assumed that connectivity, not mere adjacency, is the fundamental issue with respect to courthouse function. Thus, if two spaces were found to sustain a similar relationship of adjacency but a different relationship regarding connectivity, they would be treated as constituting fundamentally different spatial structures. Accordingly, the analysis of functional diagrams takes the preceding analysis of graphs as its starting point: Only when two plans are realizations of the same underlying graph is it worth asking whether they are also realizations of the same functional diagram. Essentially, therefore, the question raised here is whether a given graph is realized in one or in more geometrical patterns. Or, to put it in different terms, the question asked is how far the underlying connectivity that is so important to function is also a determinant of plan geometry.

Figure (3-18), therefore, arranges the functional diagrams corresponding to different court buildings according to the 7 graphs previously identified and represented in Figure 3-14. Of the 15 court buildings that comply with the graph of prescribed relationships, 10 also display the same functional diagram. Islip is among these buildings and thus appears to follow the dominant trend in this respect too. The other 7 buildings

display slightly different diagrams.²⁵ Thus, even buildings that realize the same graph of relationships can assume different geometrical forms.

²⁵ The graph presented in Figure 3-18 did not include the two courthouses that do not have the judges' chambers on the same floor as the courtroom and the rest of the functions because the geometric functional configuration is different although the same topological relationships.

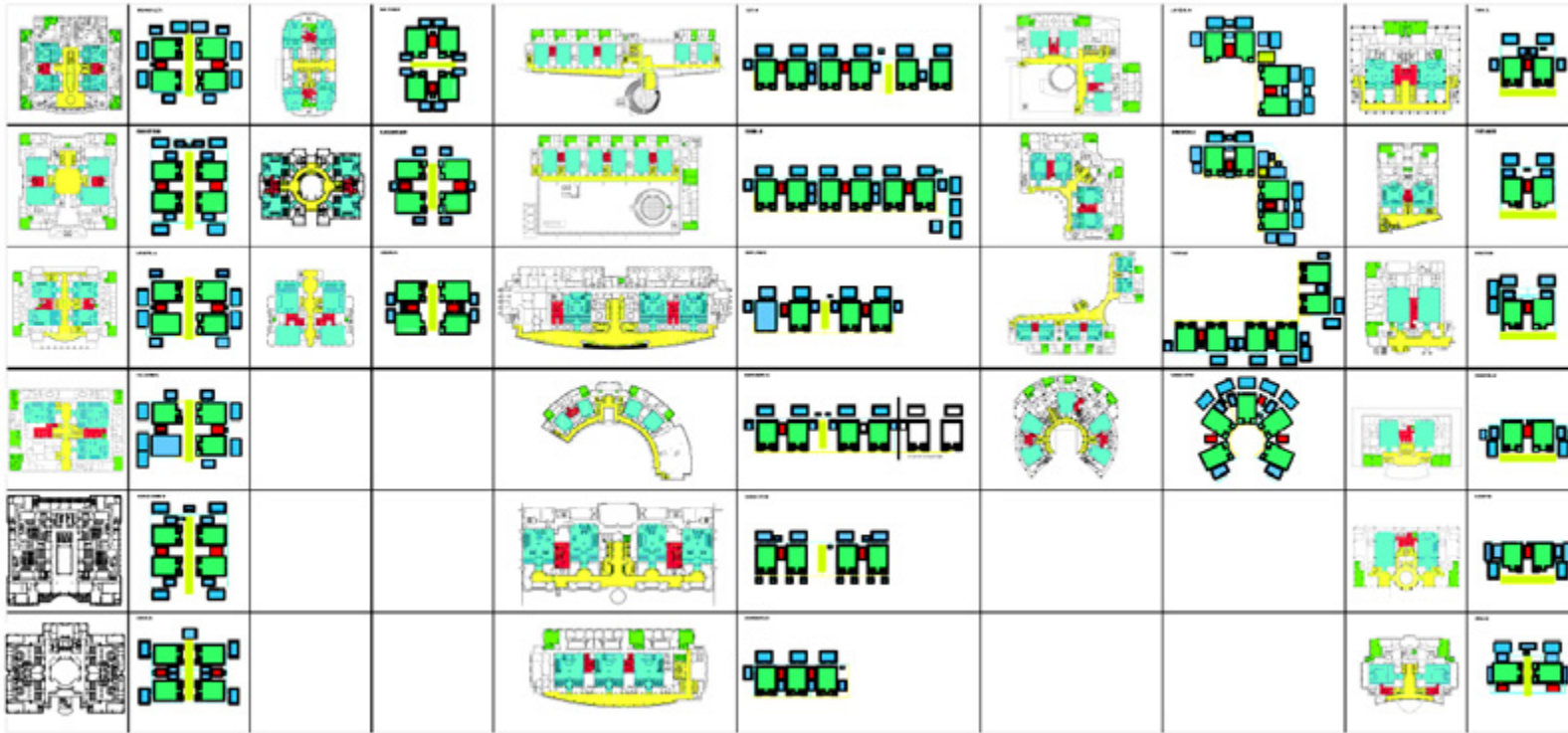


Figure 3-16 diagrammatic representations of a sample of 25 court building plans (Source: Author)

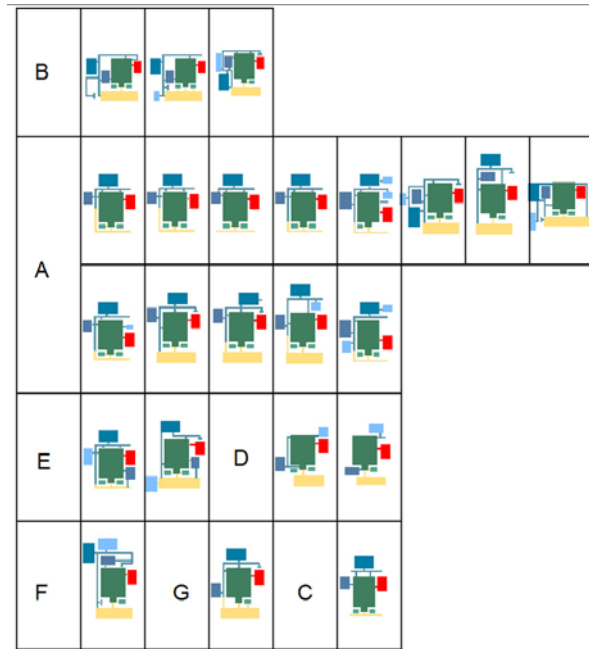


Figure 3-18 Connectivity graphs and associated functional diagrams for a sample of 25 court buildings (Source: Author)

Up to this point the analysis suggests that while the court building is strongly determined by functional requirements, there is some degree of variation in both the exact pattern of connections and the exact pattern of geometrical relationships that accommodate the program. However, clear dominant trends are identified both with respect to connectivity genotypes and with respect to functional diagrams. In both respects the Islip courthouse is conforming to requirements and to the dominant trends. The next section will shift attention from the court set as the basic cluster of accommodation, to the floor plan as a whole.

3.8 Growth patterns: from the plan of the courtroom set to the plan of the court building floor

Court buildings are fundamentally recursive. The same cluster of accommodation, the courtroom set, is repeated many times over, on the same and on different floors. Thus, it is natural to ask how the basic clusters of accommodation are arrayed into recursive patterns to produce the overall plan. Figure 3-16 helps to reveal some interesting

similarities and differences between court buildings in this respect. In 21 out of 25 cases all accommodation related to courtroom sets was on the same level; only in four buildings does the courtroom set span across two successive building floors, with the judge's chambers on a different floor than the courtroom itself. In 9 cases four courtroom sets were arranged in pairs on the two sides of a central atrium space. In the other cases courtroom sets were arranged in some form of simple succession.

In ten cases linear succession involved the creation of a shallow zone of public space in the front of the building, a deeper middle zone including the courtrooms and associated spaces, and a back zone with judge's accommodation. This pattern results in different plan geometries. In 5 out of the 10 cases the court building plan is literally linear; in 3 cases it is L-shaped and in the 2 remaining cases the plan assumes a circular form.

In order to make sense of the alternative patterns of recursive arrangement that are suggested by the foregoing heuristic investigation, two different models of court-set configurations are proposed, the concentric and the linear. The essential difference between these arises from the location of the public, whether it is centralized between the courtrooms and accessed from both sides and whether it is located on the periphery of the configuration so that access to the courtrooms is only from one side of the public space. The two models are presented in Figure 3-19.

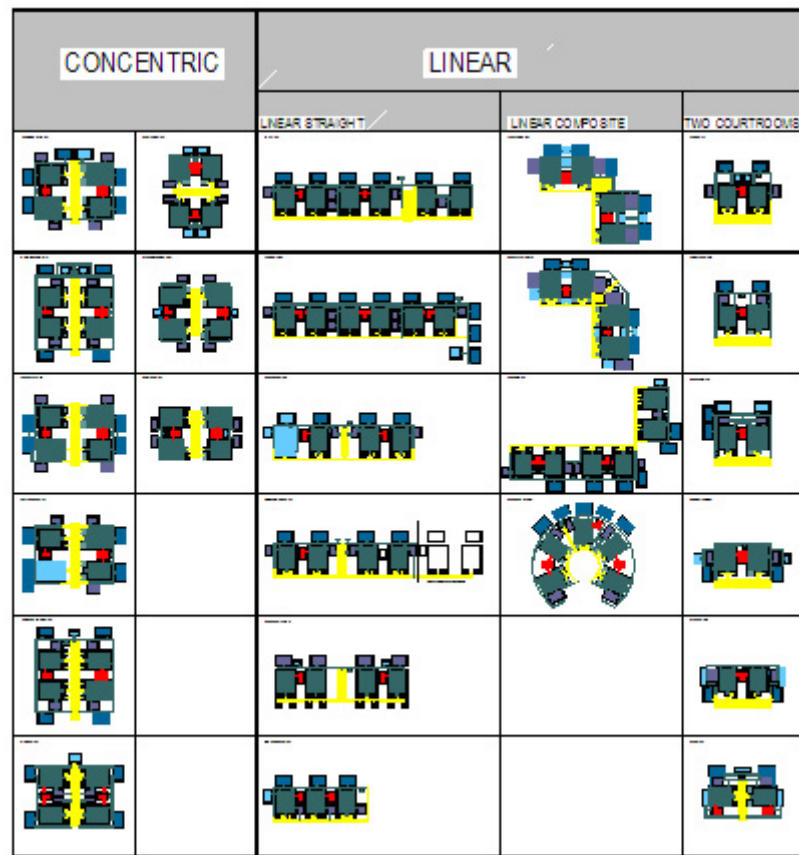


Figure 3-19: concentric and linear patterns of recursion in the configuration of court building floor plans (Source: Author)

In the concentric model the courtroom floor has a central public space with courtrooms arranged on two sides of the central space. The restricted or private zone lies on the periphery. Public circulation is concentrated in the center of a rectangular form. Private or restricted circulation circumscribes the courtrooms and connects the various restricted parts: judges' chambers, jury deliberation rooms, court support, and the courtroom along with the restricted vertical circulation. A generic diagram for this type, drawn according to the 9 court buildings, is presented in Figure 3-20.

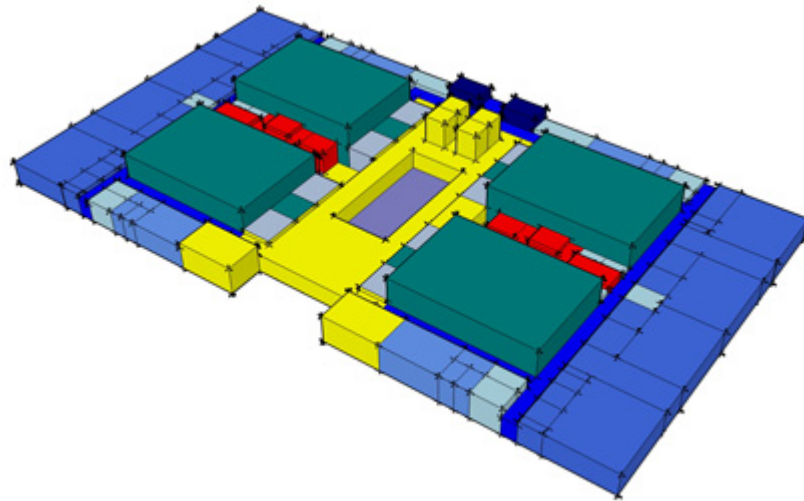
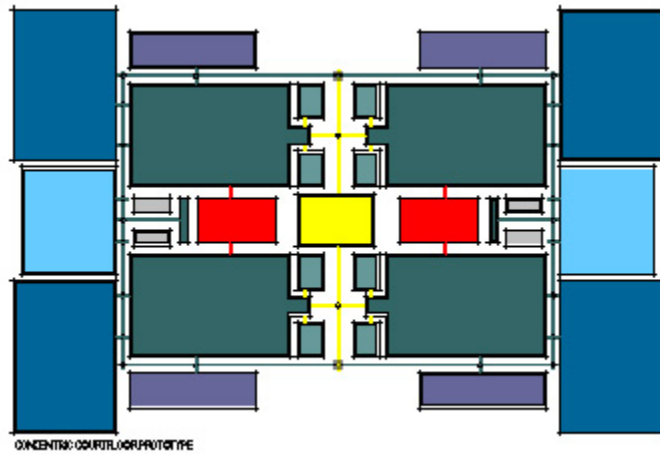


Figure 3-20 diagram of the concentric configuration of the courtroom floor (Source: Author)

In the linear configuration, public space forms a more or less continuous thin zone on the front side of the configuration. Courtrooms define the inner edge of the zone. The restricted circulation system also tends to be linear, and arranged on the back side of the courtrooms, as shown in Figure 3-21.

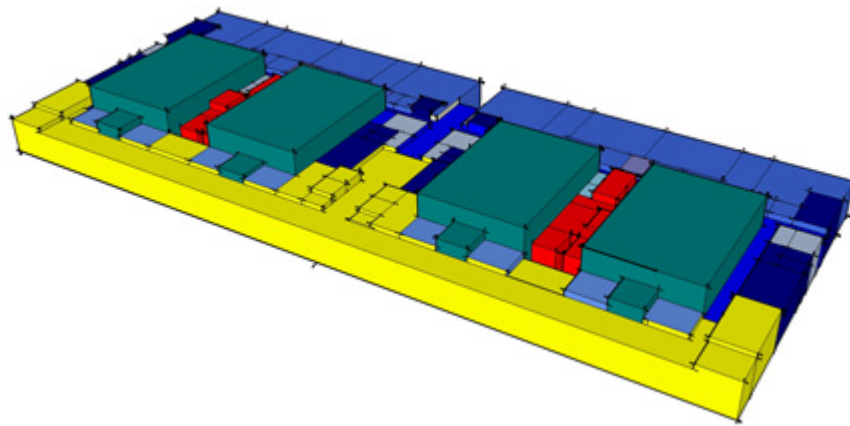
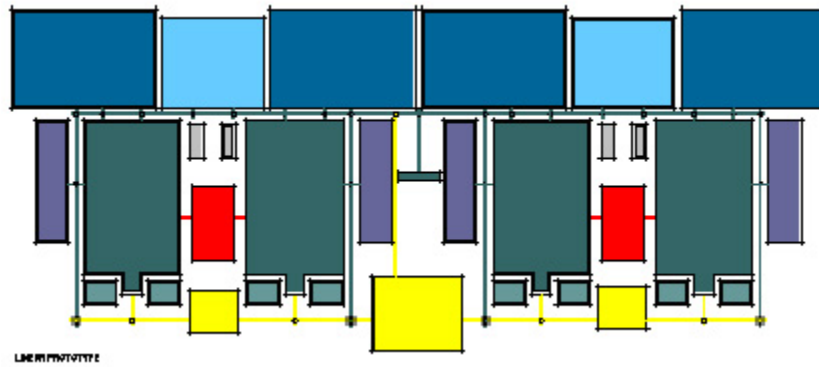
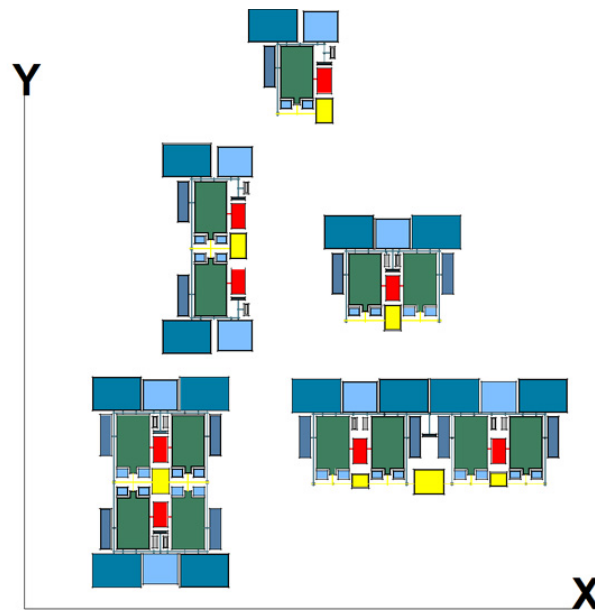


Figure 3-21 diagram of the linear configuration of the courtroom floor (Source: Author)

The 25 plans analyzed above fit into these two underlying configurational patterns. The sample includes 9 concentric and 16 linear plans, some of which are elementary in that only a very small number of courtrooms is found on each floor. Thus, the two models are themselves genotypical of the court building as a type. They complement the more specific connectivity genotypes and functional diagrams discussed earlier in making explicit the manner in which building design is constrained by program.

The impact of programmatic requirements upon design is always mediated by the structure of mathematical constraints and possibilities. The two growth models identified here can be interpreted according to the symmetric transformations which can be applied to the repetition of an elementary accommodation cluster and the creation of composite arrangements. Figure 3-22 shows how an elementary cluster can be reflected about a

vertical and a horizontal axis to produce a binary arrangement, which can then itself be reflected about horizontal or vertical axes to produce arrangements of four clusters which represent the linear and concentric models.



**Figure 3-22 Symmetric operations that generate courtroom floor plans from the courtroom set
(Source: Author)**

There are four isometric transformations possible in two-dimensional space: two direct, and two indirect. The two direct transformations are translations and rotations, and the two indirect transformations are reflections and glide reflections. Collections of rotations produce the cyclic groups and collections of rotations and reflections produce the dihedral groups. The cyclic and the dihedral groups combine with translations and glide reflections to produce the 7 frieze groups of the plane. Thus, we can model the entire set of possibilities that are open as a courtroom set is used to produce courthouse floor plans through symmetry transformations. Figure 3-23 illustrates such possibilities through the generation of the concentric floor plans in the selected sample.

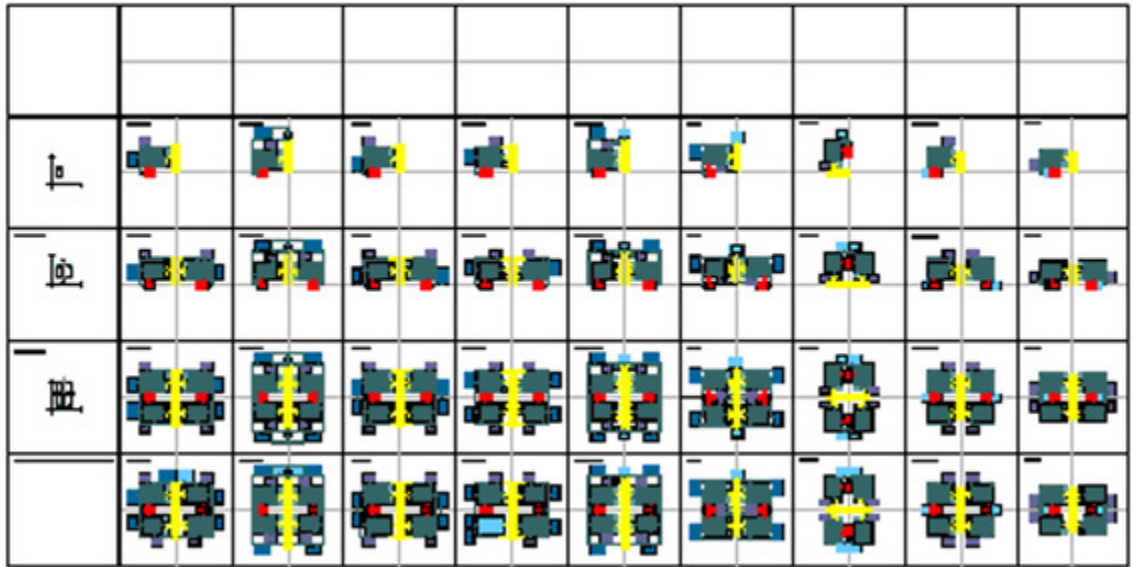


Figure 3-23 possible floor plans based on symmetry transformations applied to an elementary court set (Source: Author)

Figure (3-23) shows that as symmetry transformations are applied in recursive steps to increasingly complex arrangements, floor plans can become quite complex. The dominant arrangements identified earlier can now be interpreted as those subsets of formal possibility that preserve the coherence of the plan as a single whole. Thus, the concentric grouping of four courtroom sets around a single atrium, allows the atrium to act as the conceptual and perceptual integrator of the plan. Likewise, the repetitive arrangement of individual or paired courtroom sets along a single axis allows the axis to act as the conceptual and perceptual integrator of the plan. One formal possibility that is in principle consistent with the requirement of integration and is not represented in the sample is a linear arrangement along both sides of a central public zone, or the creation of a linear atrium. Speculations about why this is so are outside the scope of this chapter. We conclude, however, by noticing that Islip is a clear instance of the linear model which is quite well represented in the sample.

3.9 The emerging spatial structure of the linear floor plan

What are the consequences of the above processes of growth? What structure of spatial relationships emerges as these underlying possible transformations are implemented in actual plans? In this section we discuss the structure of circulation at the floor level, as it emerges from the arrangement of distinct court-set clusters in the linear model. Figure 3-24 shows three alternative representations of the 9 linear plans. The first representation (row two) shows the public and restricted horizontal circulation systems around the main functions spaces associated with the courtrooms. The second representation (row three) shows the syntactic linear maps of the floor plans. The third representation (row four) shows the contour of public lobbies and circulation as well as the structure of visibility relationships within it. These representations will help answer the question.

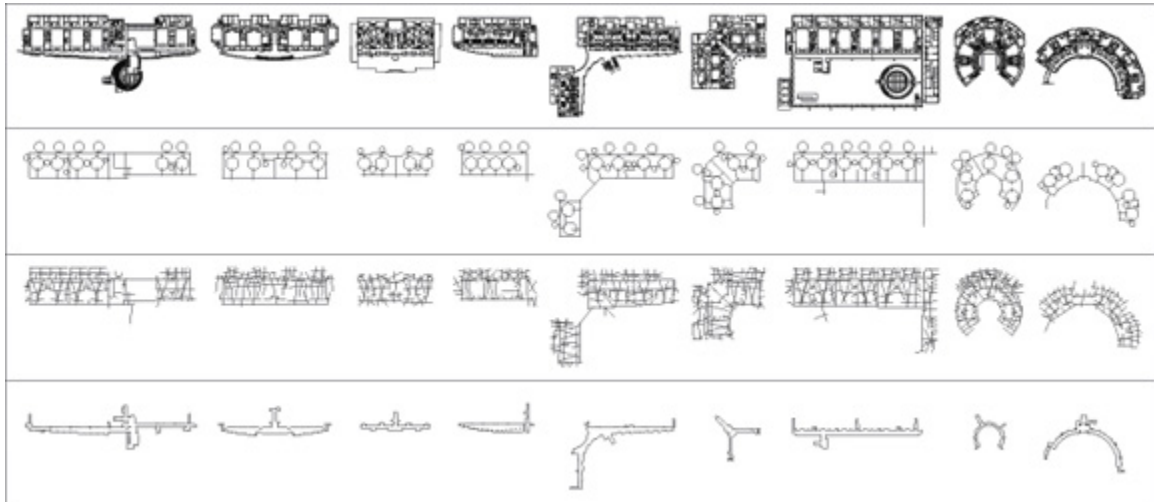


Figure 3-24 representations of the emergent circulation structure of the linear plan (Source: Author)

The simplified circulation diagrams of the second row show that in 7 out of 9 cases the public and restricted circulation systems form loops around the courtrooms. The other 2 cases differ because the judges' chambers are on a different floor. The loops that prevail in 7 cases are comprised of short transverse corridors, with check points at the

interface between public and restricted circulation, and long corridors at the front and back of the building for public and restricted circulation respectively.

The line maps presented in the third row of Figure 3-24 were analyzed using Spatialist. The results of the analysis are shown in Figure 3-25. In 7 out of 10 cases the back axis, the axis of restricted circulation is the most integrated (red). This strongly suggests that court buildings tend to privilege the integration of spaces associated with inhabitants. A similar finding was reported in section 3.5 above, based on the analysis of the court-set alone. Islip conforms to this pattern (black box). The discrepant cases (red box) can be interpreted in two ways. First, the plan may be articulated so as to suggest two distinct wings, radiating out of a central block. This results in an interruption of the continuity of the back corridor. Second, the placement of judges' chambers on a different floor reduces the connectivity of the back corridors and thus brings their relative integration value down.

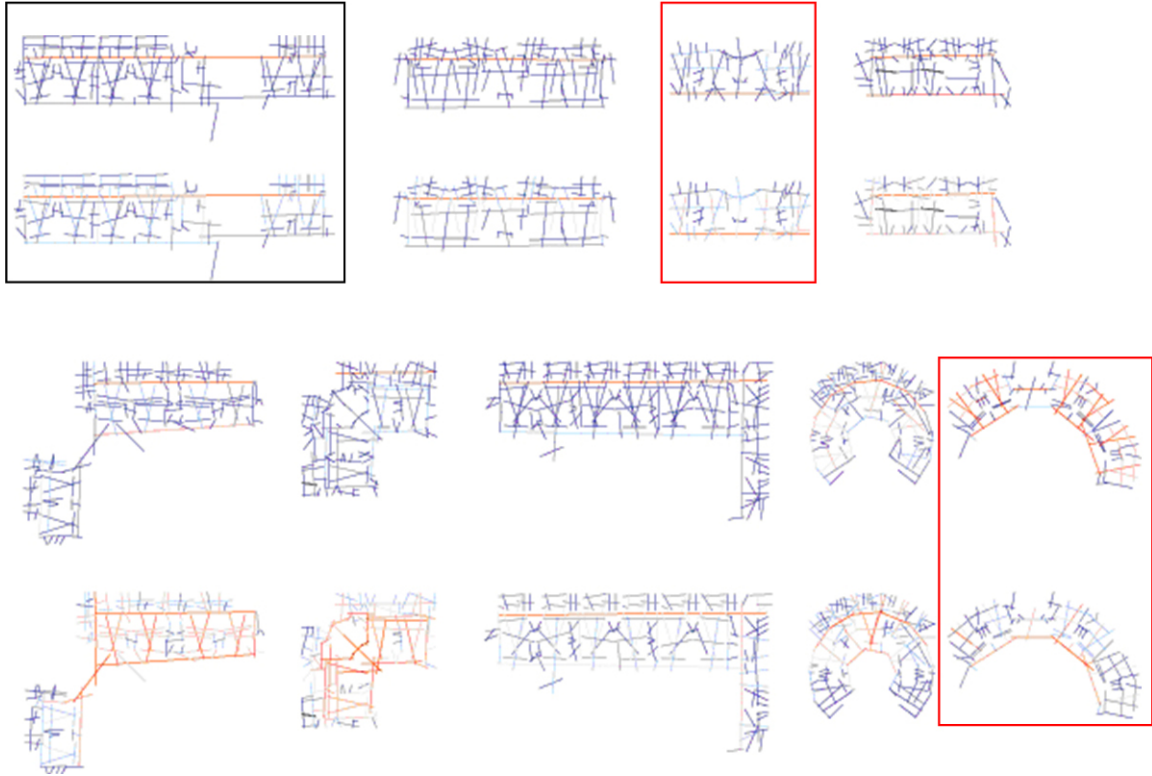


Figure 3-25 analysis of the axial line maps of linear court building configurations. The upper row is colored according to connectivity values and the lower row according to integration. The spectrum from blue to red corresponds to the spectrum from lesser to greater values (Source: Author)

While the spatial integration of circulation over the entire floor of a linear configuration is biased towards the back restricted system, the architectural elaboration of the plan is aimed at celebrating the front part of the circulation which is associated with the public and is thus more critical to the architectural expression of the idea of a public building. Thus, the last row in Figure 3-24 presents the outline of public spaces. The spaces thus outlined were analyzed for their internal structure of visibility using DepthMap. The results of the analysis are shown in Figure 3-26 where the spectrum from blue through green, yellow, orange and red corresponds to higher values.

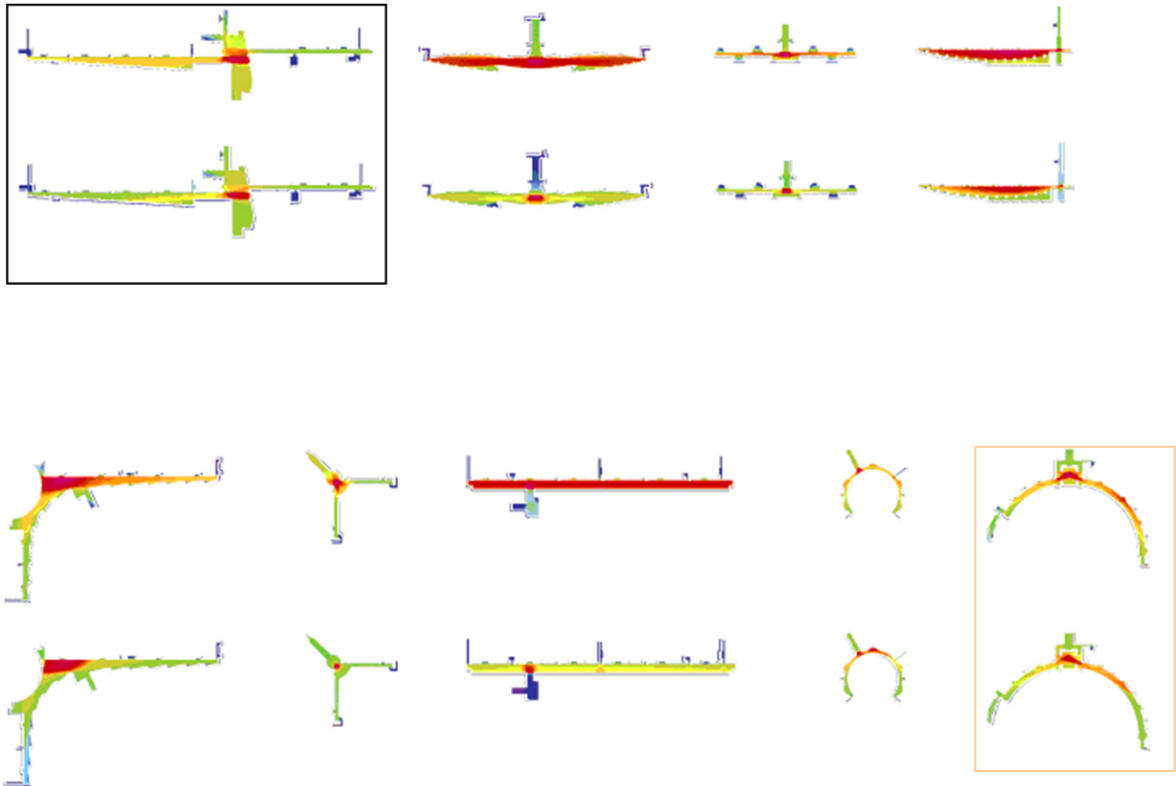


Figure 3-26 visibility analysis of the public space in linear courthouse buildings (Source: Author)

The visual connectivity core picks up the spaces from which the visibility polygon has a greater area. In 7 out of 9 cases the visual connectivity core spreads along a long and relatively wide circulation space, whether it is axial or curvilinear. In two cases, including Islip, the connectivity core is concentrated in a more compact space corresponding to a hall or an atrium.

The visual integration core picks up the spaces from which all other points within the outline are fewer corners away. In 3 cases the visual integration core is much more limited in area than the connectivity core, as a response to the articulation of the overall outline into distinct convex spaces. In 4 cases the visual integration core is almost coextensive with the connectivity core. This picks up the relative lack of articulation of the public space. In only 2 cases, including Islip, do we have both the connectivity and

integration cores coinciding with relatively limited convex areas in the public space zone? This case is the lower right half radial graph in figure 3-26

In the case of Montgomery Federal courthouse (orange outline), this reflects a radial plan in which the visual emphasis is drawn into the central hall where distinct circulation axes converge. In Islip, on the other hand, this reflects the offset of two primary circulation axes coming into a main atrium. One axis corresponds to District and Magistrate courtrooms and the other to Bankruptcy courtrooms. The offset of the axes emphasizes the atrium as the visual and spatial fulcrum of the composition, even though the plan is not at all radial as in XXX. We note here that Islip is the only courthouse building that has a full-height atrium. In some of the linear courthouse buildings, there is a central hall which is several stories in height, but not an that penetrates the full height of the building, while the rest of the linear courthouse do not have an atrium. In that sense, Islip is discrepant as compared to other linear plan court buildings in the sample.

3.10 Chapter Summary

This chapter has had two aims: first, to reconstruct the charge and design problem situation that applies to the design of courthouse buildings; second, to situate Islip within the field of constraints affecting courthouse design. The analysis of the charge has initially been based on a review of two different kinds of documents, those pertaining to the largely qualitative and symbolic aims of the Excellence Program, and those pertaining to the programmatic requirements and constraints arising from courthouse function. Subsequently, the reconstruction of the design problem implicit in the charge was based on a comparative analysis of courthouse buildings.

The aims of the Design Excellence Program are inherently and deliberately imprecise as to their formal implications. The Design Excellence Program was explicitly aimed at avoiding the mergence of some single official style. Thus, the evaluation of any building against the aims of the Design Excellence Program is largely a task of architectural criticism which is outside the scope of this chapter. By contrast, the

functional requirements and constraints have been subjected to analysis. Overall, it was concluded that while courthouse design is highly restricted and prescribed according to programmatic requirements, both the patterns of connection and the geometrical arrangements realized in individual buildings vary slightly. The variation, however, is underpinned by clear genotypical tendencies that are, by the statistical stability, of certain kinds of relationships. These relationships, more than the programmatic documentation, can be construed as the objective “programmatic charge” which constraints the design of courthouse buildings.

From this point of view, Islip emerged as a conformist design, which is as a design that conforms fully to genotypical trends that characterize the sample of buildings analyzed. This is a rather critical conclusion from the point of view of the argument to be developed in subsequent chapters. If indeed Islip also conforms to the rules of a particular design language, the language of Meier, it does so without in any discernible way challenging the objective programmatic charge. There is only one caveat to this statement. Islip is the only linear plan in the sample to invest into a full height atrium which acts as the visual connectivity and visual integration core of public space and public circulation. The significance of this will be taken up in a later chapter.

4 CHAPTER 4: THE DESIGN BRIEF: THE FORMAL LANGUAGE OF RICHARD MEIER

4.1 Introduction

As argued in chapter two, design as formulation is about the interaction between the design charge, design brief, and the emergent qualities of the designed object. Chapter three reconstructed the design charge of the Federal Courthouse building in both its symbolic and functional dimensions. This chapter discusses the design ‘brief’ of Richard Meier, as what Meier adds to the design charge during the design process. The design ‘brief’ is usually expressed through a formal design language. This chapter discusses the formal language of Richard Meier. The aim is not only to austere define the characteristics of Meier’s formal language in a way that allows the systematic analysis of the Islip Courthouse building; also, to allow the investigation of the interaction between the well-constrained program of the courthouse building and the well established formal language to advance our understanding of what architecture adds to building.

Section one will discuss the formal language of Richard Meier. As Meier’s career extends well over forty years, this section will not give an exhaustive review of Meier’s biography, background influences, or work; rather, the section will present a nucleus of a Meier formal design language between 1987, when the New York office was established, till the end of the 1990s. As a review of literature is not enough to demonstrate the characteristics of Meier’s formal language, section two will present a formal analysis of the Barcelona Museum of Contemporary Art as a detailed example of Meier’s formal language during the selected period. The aim of this section is not only to clarify the design themes and motifs of Meier’s language but also to show how these themes and motifs are employed in a particular building designed by Richard Meier. As mentioned earlier, particular emphasis while studying the language will be placed upon the geometrical ordering of building plan and elevations giving prominence to the modular and proportional systems entailed in this ordering because geometrical ordering most

closely interacts not only with the functional organization but also with the overall arrangement of formal elements of the building.

Section three will supplement the findings of the previous sections by tracing the development of Meier's formal language through looking back at some of Meier's seminal work and tracking what different authors and researchers said about his work. The literature review and analysis lead to a more clear and precise understanding of Meier's design brief. Furthermore, the Barcelona Museum of Contemporary Art is a building type with a design program that does not pose heavy functional constraints on the designer. Thus preparing for a discussion of how the formal language reacts and adapts itself to two different building types: a museum and a courthouse building, representing a weakly and a strongly constrained design charge respectively. Thus, this chapter prepares the way for the chapter five, where the Islip Courthouse building is analyzed in order to identify the aspects of its form that are governed by the design charge and the aspects that are governed by the design brief i.e. the formal design language of the architect, and by the formulation of design aims that the architect engages in within the process of design itself.

4.2 Richard Meier: Biography and Formal language

Across their careers, architects and designers explore develop and become accustomed to certain work tactics that they deploy in their designs and projects. These tactics act as an instrumental set that includes design elements, conventions, rules of thumb, and operational procedures through which they could conduct their design operations in order to foresee their final design product before its construction (Bafna, 2001). In some cases, these tactics are implicitly applied by the designer/s; in others they are consciously and deliberately applied in design and building projects. Over time, these tactics become constant and consistent across a wide spectrum of designs and building types, and according to Bafna, forming an overall design strategy a designer/s applies; they become a formal design language that distinguishes one designer from another.

This section identifies the formal design language of Richard Meier through identifying the key design elements and tactics Meier used in his buildings between 1987 and 1996 when his New York office was headed by Thomas Phifer. The study of the language is essential for the morphological analysis to be carried out in the following chapter. Thus, the study of formal language is a preliminary step towards providing a deeper understanding of the interaction between form and function in an architectural design, so as to answer the question of what architecture adds to buildings.

Over his four decade Career, Richard Meier has received more than 11 National AIA Awards, 21 New York City AIA Design Awards, as a well as the Pritzker Architecture Prize in 1984. More importantly, Meier maintained a consistent but evolving ‘signature style’ across wide variety of building types designed by his office and acknowledged by various authors and documented in over fifty-five publications. The design of the Islip Courthouse building represents a good opportunity to investigate how the formal design language of a celebrated architect as Meier interacted with a ‘well-constrained’ functional program in a design that won the both the Design Excellence Award in 2000 and National AIA Award for outstanding buildings in 2003.

4.2.1 Richard Meier’s Biography

Richard Meier received his architectural education at Cornell University in the late 1950s after which he practiced with Marcel Breuer in New York for three years before establishing his own office in New York City in 1963. During the early years his work included a number of private residences in the United States. By the end of the 1960s and onwards, Meier’s work extended to include a variety of building types ranging from private housing residences, public housing, corporate headquarters, office buildings, commercial buildings, to churches and museums. Meier has taught at Cooper union, UCLA, Harvard and Yale University as well as giving lectures throughout the United States, Europe, South America, and Japan. Along his career, Meier won numerous international and national awards among which is the 1984 Pritzker Architecture Prize, the Royal Gold Medal from the Royal Institute of British Architects in 1989, and the

American Institute of Architects Gold Medal in 1997. The work of Richard Meier was featured in numerous publications including four monograph books by Rizzoli International Press dating between 1984 and 2004 with introductions by Kenneth Frampton among others, and a book entitled *Richard Meier* by Electa Publications in 2002, besides numerous journal publications and architectural magazines articles and features.

4.2.2 The Formal Language of Richard Meier

Meier's work spans over 40 years ranging between small scale private residences and large scale public projects. In this section, the thesis will draw an overview of Richard Meier's formal language between the mid 1980s until mid 1990s in projects mainly designed by the New York Office. This does not mean that Meier's work before that period is extraneous or irrelevant; but during that period, the New York Office under the leadership of Thomas Phifer followed a design strategy that maintained Meier's 'signature style' but had a set of distinguishing characteristics that differed from that of the works carried by the Los Angeles Office.

Among the many authors who have written about Meier along his four decade career e.g. Rykwert, 1984; Frampton, 1991; Richards, 1993; Allen et. al., 1999; Cassarà 2005, characterizing his work and describing various aspects of his formal language, Joseph Giovannini was among the few that sketched out Meier's formal language by identifying general characteristics of his work with special emphasis on the projects of the New York office, in his article *Is Richard Meier really Modern* published in *Architecture* (1996). This article will be the starting point for the discussion of Meier's formal language and will be supplemented by reviews of other authors and writers in the following sections.

In his description of Meier's early work, Giovannini (1996) characterized Meier's as consisting of a parti for rectangular buildings that are approached through a section of aligned rooms opening up to multi level glazed volume. As shall be seen later, most of

Meier's private residences in the 1960s prescribe to this description. Meier's approach to designing buildings included themes like progression from dark to light, from solid to void, and *promenades architecturale* using bridges and ramps as both approach entries to buildings from the outside and as major circulation elements on the inside. Giovannini further characterized Meier's buildings as being highly disciplined through Meier's use of the grid, but at the same time, freely combined and fragmented through the use of the most basic architectural elements such as the point, line, plane, and platonic forms combined in asymmetrical but balanced compositions. According to Giovannini, Meier's departed from the highly geometrized buildings to a more '*collagist juxtaposition of forms and materials*' in the design of the Atheneum (1979) where several forms played against each other over a plan structured by two overlaying and shifted grids, a theme that also reappeared in the Frankfurt Museum, Germany (1985), and in the Getty Center (1997).



Figure 4-1 the juxtaposition of forms over layered and shifted grids as in the design of the Atheneum (1979) (Source: Frampton, 2002)

After Meier was awarded the commission for the Getty Center in 1986, he established the Los Angeles office and selected Michael Palladino, a senior partner now, who was a graduate student of Meier's at Harvard and was working for him since 1978 to

head the office. At the same year, Meier invited Thomas Phifer to become an associate, then a partner and head of the New York Office.²⁶

Starting 1987, the New York office under Phifer, worked with Meier on a number of projects that were mainly in Europe. These projects include: the Canal+ Headquarters in Paris (1992), the Weishaupt Forum in Schwendi, Germany (1992), the Hypolux bank in Luxembourg (1993), the Ulm Exhibition and Assembly Building, Germany (1993), the Hague City Hall and Central Library, Netherlands (1995), the Barcelona Museum for Contemporary Art (1995), as well as several unbuilt projects such as the Bibliothèque de France competition (1989), and the Jean Arp Museum I, Germany (1990) among others. In the United States, the New York office was responsible for the design of the Portland Eye Center (1986)-that was not built, as well as the design of two U.S. Federal Courthouse Buildings in Islip, New York (2000) and Phoenix, Arizona among others. According Giovannini (1996), despite the fact that the work of both partners is unified by Meier's style, the underlying strategy in Meier's New York office is different.

Giovannini remarked that the designs by the New York office reflect a shift in Meier's design strategy. These shifts include expressed and clear circulation, processional sequence from the outside inwards and through the design of the interior spaces of the building, and a decisive frontality expressed through linearity of design in a manner that that reflects an inclination towards monumentality.

In their designs, the New York office emphasizes clarity of the overall organization through the employment of a spinal wall that marks a continuous circulation spine or axis. Such a treatment can be found in the unbuilt Bibliothèque de France competition (1989), and the Jean Arp Museum I (1990) among others (Figure 4-2). The spinal wall is often crossed by a 90° degree secondary axis marked by a transverse wall such as the case of the Barcelona Museum of Contemporary Art (1995) (Figure 4-3). Furthermore, in large public buildings, the program of a given building is restructured so

²⁶ Phifer left Meier's New York office in 1996 after working there as the head of the office for a decade and established his own office in New York. A profile of his office can be found over the over the world wide web at <http://www.tphifer.com>

that programmatic functions are isolated and expressed separately, in many cases on one side of the spinal wall, while the public spaces are expressed in stand-alone rectangular structures, cylindrical or conical forms recalling what Giovannini called '*traditional civic rotundas*'. Examples of such projects include the Bibliothèque de France competition (1989), the Royal Dutch Paper Mills Headquarters (1992), and the Hypolux Bank Building (1993), and the Barcelona Museum of Contemporary Art (1995) (Figure 4-4). In many of the projects, these 'break-out forms' intended for special functions are not used in their platonic state i.e. solid and absolute; rather, they are broken, articulated and interpenetrated, and transformed becoming figure-like sculptures such in the case of the Canal+ Headquarters, the Hypolux Bank Building, and the Barcelona Museum (Figure 4-5). These forms are played against the main masses of the buildings, in some cases such as the Jean Arp Museum I, the main mass of the building is a circulation wall against which a series of forms are played, while in other projects the main mass of the building is conceived as 'a thick and layered bar' that contain the main spaces of the building. These bars, which are geometrically linear, are mostly straight, orthogonally organized in zones marked by walls and columns that give the building a 'recessional depth' such as the case of the Barcelona Museum (Figure 4-3). According to Giovannini, these forms that emerge as 'free standing symbols' against the buildings '*stabilize Meier's buildings*' and create a '*punctual order*'. The juxtaposition of circles or parts of circles against linear elements or rectangular blocks became one of Meier's reoccurring themes in many of the previously mentioned buildings. The overall buildings are organized over an underlying grid that Giovannini calls "*internally differentiated and textured, each divided into two squares and two golden rectangles that set the entire fabric of the building in repetitive A-B-A-B rhythms, as in the Barcelona Museum.*" (1996, p. 68).

The quick summary presented above sketches out characteristics of Richard Meier's formal language verbally without in-depth analysis of how these characteristics are applied or employed within a certain design project. The next section will present one of Richard Meier's projects as an exemplary case study of his formal language. The project selected as a case study is the Barcelona Museum of Contemporary Art (1995). The project is selected because it is one of the celebrated cases of Richard Meier and

according to the summary presented previously, one of the most exemplary projects of his formal language.

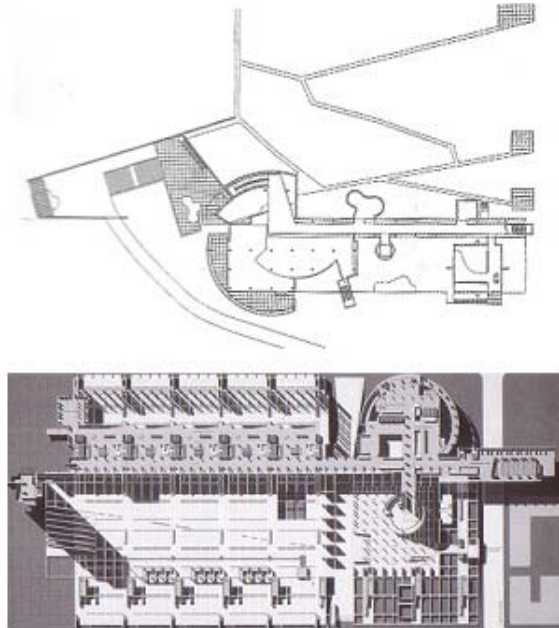


Figure 4-2the spinal wall theme reoccurring in the Jean Arp Museum I (upper plan), and Bibliothèque de France competition (Source: Frampton, 2002)

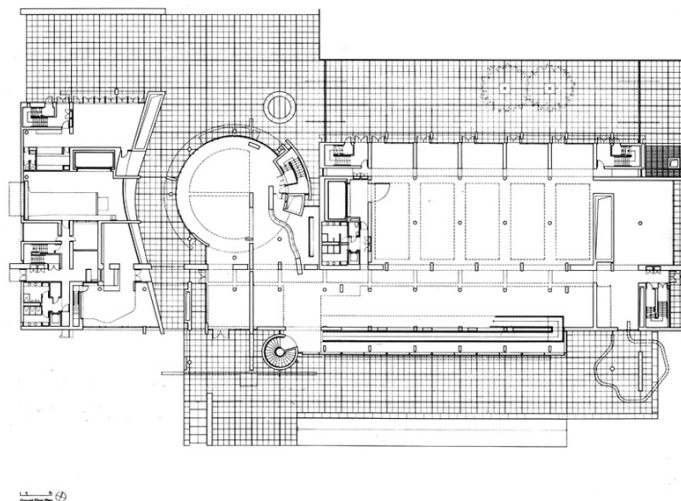


Figure 4-3the transverse entrance wall as it appears in the Barcelona Museum of Contemporary Art. (Source: Richard Meier's office)

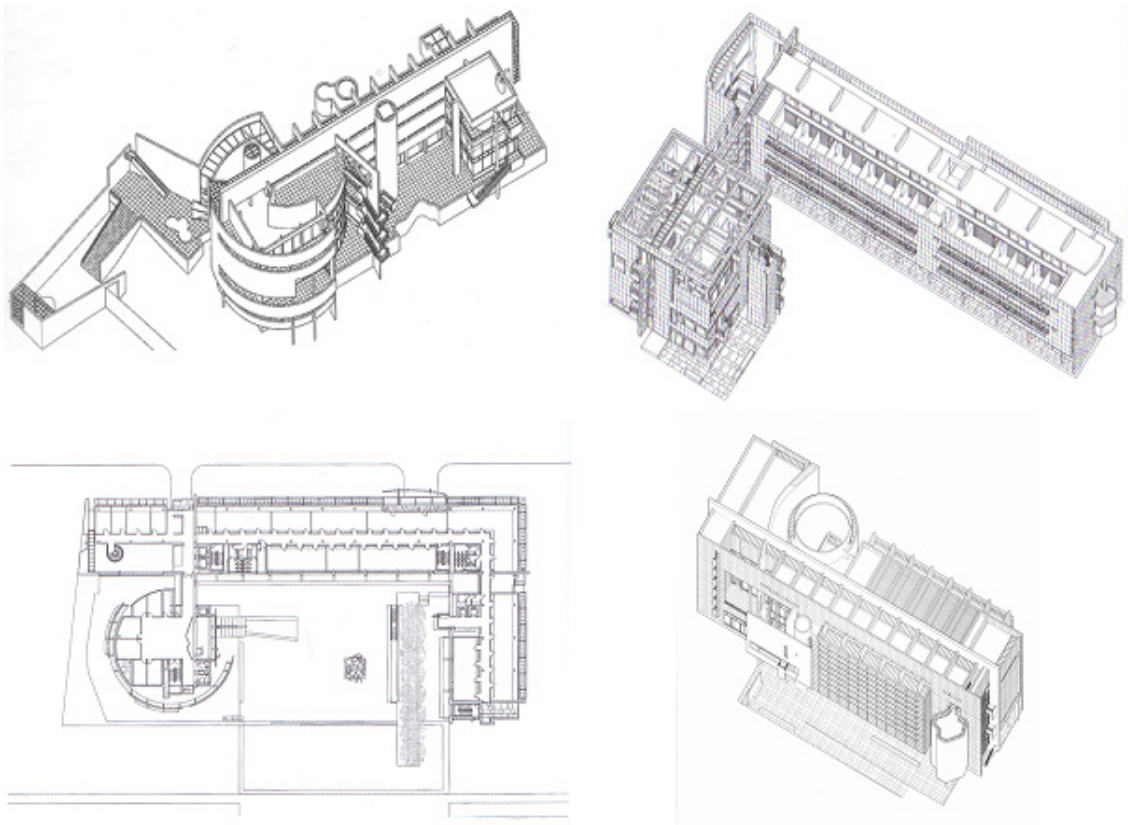


Figure 4-4 formal juxtaposition as demonstrated in Meier's different buildings: the Jean Arp Museum in the upper left, the Royal Dutch Watermills Headquarters in upper right, the Hypolux Bank on the lower left, and the Barcelona Museum in lower right. (Source: Frampton, 2002)



Figure 4-5 articulation of projected forms as it appears in the entrance to the Hypolux Bank on the left and the entrance rotunda of the Barcelona Museum to the right. (Source: Frampton, 2002)

4.3 Case Study: The Barcelona Museum of Contemporary Art

The section of the chapter will present the Barcelona Museum of Contemporary Art as exemplary of major trends in Meier's formal language identified earlier. The choice of the museum is based on the fact that it was designed by Meier's New York office before the design of the Islip Courthouse building, and thus sets a precedent for the design of the Islip Courthouse; it is designed in a historical urban context that is completely different from the Islip suburban site; and more importantly, it houses a museum, a building that is described as a 'weak' program building, which poses less constraints on the designer than a courthouse, a 'strong' program building that has a strong functional genotype which presumably passes high design constraints.

The aim of this part is to not only to show that Meier has a consistent formal language across a variety of building types and contexts, but also to make explicit the underlying design tactics that were applied by the Meier and exemplify how they are employed in a certain building. This will yield a better understanding of the relationship between the generic formal language of Meier, its interaction with a specific building program, and the differences and similarities with the design strategy of the courthouse building. Furthermore, the analysis presents a case study against which the design of the Islip Courthouse can be compared.

The section is divided into two parts. Part one will present the background and the description of the museum. The aim is to familiarize the reader with the museum. Part two will present the formal analysis of the museum. The analysis of the formal structure of the Contemporary Art Museum will deal with both 2-D and 3-D aspects of the building such as underlying geometrical modules, design elements, and design themes.

The formal analysis will be based on the drawings and presentations provided by the office of Richard Meier as well as other graphic sources. The plan of the museum was scaled and then redrawn using AutoCAD software and the measurements were checked against information derived from the literature review for accuracy.

4.3.1 Museum Background

The origins of the urban framework for the Barcelona Museum for Contemporary Art lie in the urban design policy developed by Oriol Bohigas and his colleagues (Richards, 1996).²⁷ As opposed to large scale master planning, this policy for Barcelona depends on establishing a series of small-scale initiatives for the renewal of decayed city fabric following the end of the Franco dictatorship in the 1970s. Bohigas' policy included the establishment of new small-scale piazzas along with the rehabilitation of several significant buildings including churches and convents within the fabric of the former monastic cloister and the labyrinthine paseos and buildings of the Barri Gothic. These interventions, which included considerable demolition, suggested a design response that would create five linked public squares of different local character within the urban fabric of the city. The detailed urban planning proposals for the area included the development of Casa de la Caritat and the Casa de la Misericordia.

Meier was invited by the Mayor Pasqual Maragall after they met in New York in 1984 to look at a number of sites within the city, which were considered for the construction of a contemporary art museum. It was within the Casa de Caritat, an old monastic enclave, located in the Raval neighborhood, an old Gothic quarter of the city, that the Contemporary Art Museum was constructed. The construction of a museum in this site along with the Casa de la Caritat cultural center and the new university building was meant to consolidate this new arts quarter to the larger urban fabric of the city of Barcelona.

The city of Barcelona decided to build the museum in 1987 and Meier was commissioned to do the design in 1988. The client consortium consisted of the Government of Catalonia, the city government, and the private sector of museum sponsors. The Construction started in 1990 and was finished November 1995. The

²⁷ Around the beginning of the 1980's, the city of Barcelona regained its municipal democracy and under Pasqual Maragall, the Mayor of Barcelona, a program for the reconstruction of Barcelona was initiated. Among the areas selected for urban renewal and regeneration was the neighborhood of Raval where the museum is located.

building is a basically a rectangular building block measuring 120 feet in width, and 400 feet in length from east to west. The full height of the building is 77 feet consisting of three stories for gallery space in the eastern wing and seven stories of office space in the eastern wing (Buchanan, 1996).

4.3.2 Building Description and Analysis

The site selected for the Contemporary Art Museum in Barcelona was suitable for such a building in Meier's mind because it is a place "*where a new construction could create a dialogue among existing structures and topography, as well as be a part of a pedestrian network that runs through the old city.*" (Meier, 1997, p. 16). Thus, Meier designed an open plaza in front of the museum i.e. the Plaça dels Angels facing the southern façade of the building, to foster pedestrian activity and extend existing activities taking place in the old plaza.

The museum can be approached from several tight streets coming in from Las Ramblas (Figure 4-6). Once visitors enter the Plaça des Angels, they are in view of the free standing museum building with its white skin and array of forms displayed on its southern elevation. The whiteness of the museum stands in contrast to both the dark granite-girded paving of the plaza and the dark color of the surrounding. The plaza is minimally landscaped; there is one long stone-faced bench that runs parallel to the museum building along with eight trees next to the chapel outside the plaza's main space (Dollens, 1997). Because the plaza is not on one level, the museum is raised on a plinth one meter above the general level of the plaza. Visitors' access to the ground floor entry level is either through a small flight of stairs²⁸ or up on an external low ramp that runs parallel to the main frame of the museum and echoes the ramps inside the museum. The plaza flows continuously around the museum connecting the main plaza in front with the

²⁸ In the drawings for the museum, as well as the model, the stairs were celebrated by a short free-standing wall that defines them which runs perpendicular to the building; in reality the wall was never constructed; it was replaced by short plinth that can be used for seating.

smaller space of the Centre de Cultura Contemporània and a new university building in the rear (Figure 4-7).

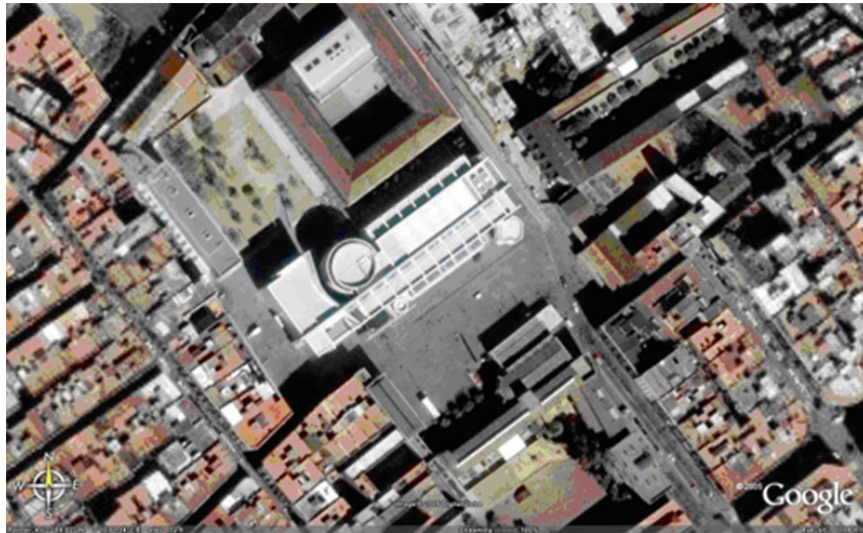


Figure 4-6 aerial view of the museum (Source: Google earth)

A pedestrian pathway- the *Paseo* cuts through the main body of the building dividing it into two wings; an western wing containing administrative spaces and galleries, and an eastern wing with the entrance rotunda and the main exhibition spaces. The two wings of the museum are re-joined by a wall that runs along the whole length of the building. An entrance rotunda lies to the east of the *Paseo* while a curved wall that cuts through the building celebrates both the pathway and the entrance rotunda from the west. Through the *Paseo*, Meier paid homage to the existing labyrinthine paths ways and alleys surrounding the site. The *Paseo* connects Plaça dels Angels in front of the museum and the garden court adjacent to the Casa de la Canitat to the back of the museum. The design of the ground level of the museum continues the existing paths in the site linking the new plaza in front of the building with the pedestrian system serving the cultural center and the university at the back (Figure 4-8).

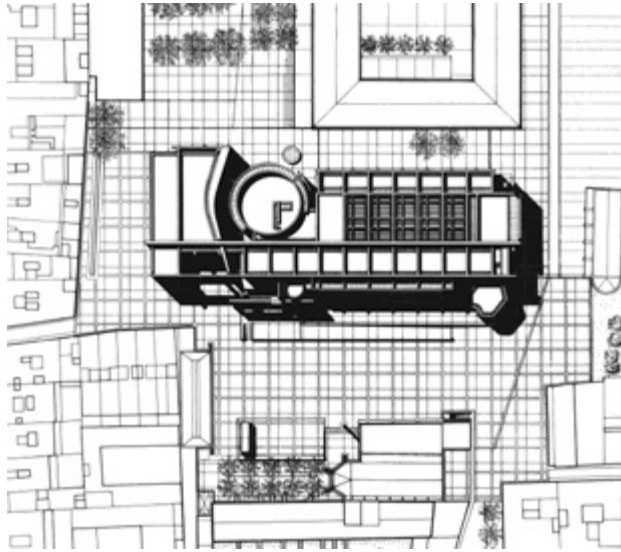


Figure 4-7 the plaza around the museum with the *Paseo* cutting through the museum's block (Source: Richard Meier's office)

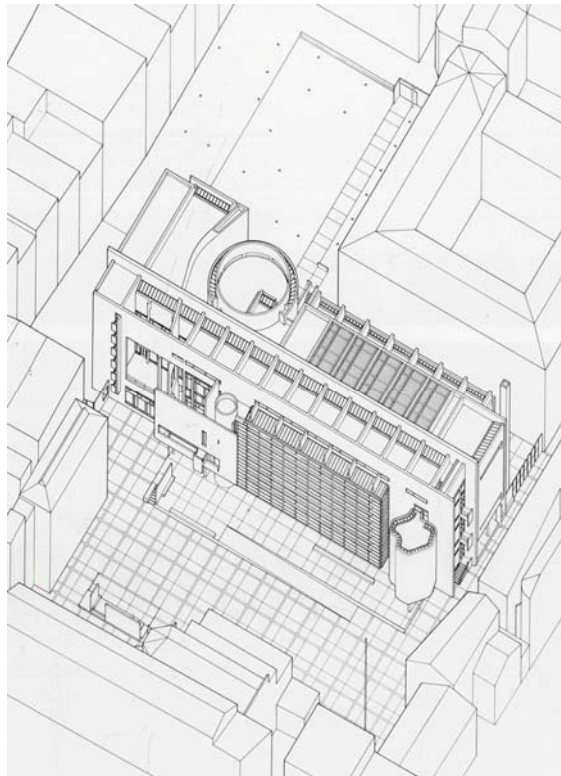


Figure 4-8 museum isometric showing the plaza, raised plinth, and *Paseo* (Source: Richard Meier's Office)

As in other Meier's buildings, the southern/plaza elevation overlooking the Plaça dels Angels is clad in Meier's signature white enameled-aluminum panels. The plaza elevation is animated by an array of different elements: an aquarium green three-sided glass box, the two plaster sculptural elements; a cut-out plane hanging above the entrance; and a free-form top-lit "special exhibitions" gallery set in advance of the building at the eastern end of the main façade (Figure 4-9). The elevation is further animated by a recessed double height terrace to the west of the *Paseo*.



**Figure 4-9 frontal view of the southern facade showing the array of forms animating the façade
(Source: Frampton, 2002)**

The main entrance of the museum is marked by hanging wall-screen-a plane that projects above the entrance portico (Figure 4-10). Visitors pass under the cut-out hanging plane, and enter the museum via the partially glazed double-height cylindrical lobby. The entrance movement is further controlled by a transverse wall plane at 90 degrees to the main geometry of the plan (Figure 4-11). From inside the lobby, it is possible to view into the *Paseo* and across to the western wing of the museum. The space of the lobby is penetrated by a free form curved marble counter-information desk that leads visitors from the entry lobby in a rotational movement towards what can be regarded as the main atrium-like space inside the museum (Figure 4-12). This triple height atrium-like hall that

unfolds along the front façade of the building contains the main ramp linking the three floors of exhibition space within the eastern wing of the museum. This transparent hall is extensively glazed, thus affording broad views of the Plaça, orienting visitors through the museum, and mediating between the public space outside the museum and the exhibition galleries inside. As one ascends and descends that ramp, vistas of the 16th century church in front of the museum and the romantic old beyond unfold. Natural light is filtered through the brise-soleil covering the glass wall of the ramp.



Figure 4-10 the animated plane hovering over the main entrance (Source: Meier, 1997)

From the outside, the ramp hall is a three-sided glass box fabricated of modularly gridded green glass panes held in white enamel aluminum mullion frame (Figure 4-13).²⁹ From the outside the glass box shifts the attention of the urban viewer between the external wall screens and the interior ramps creating a visual venue into the dynamic movement inside the museum, while from the inside, the viewer's attention shifts between the exhibition gallery space inside and the urban view of the building surrounding the museum outside.

²⁹ According to Dollens (1997) at that time, the wall of the atrium like space is one of the largest glass walls in Meier's European work after the city hall at The Hague and Canal+.

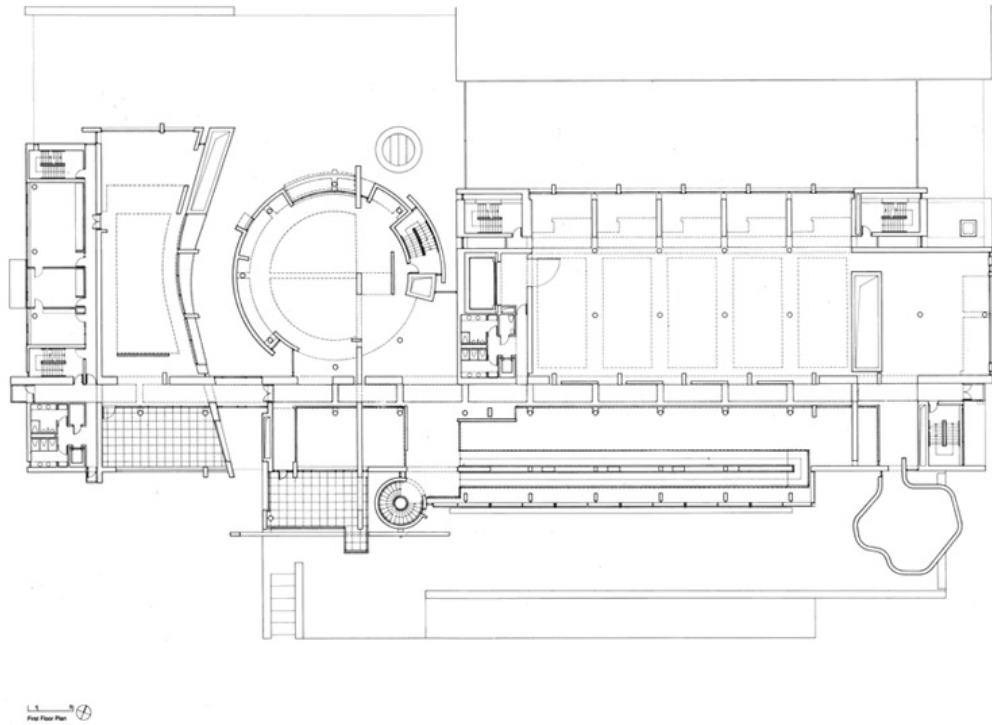


Figure 4-11 ground floor plan showing the transverse wall leading to the entrance rotunda. (Source: Richard Meier's Office)

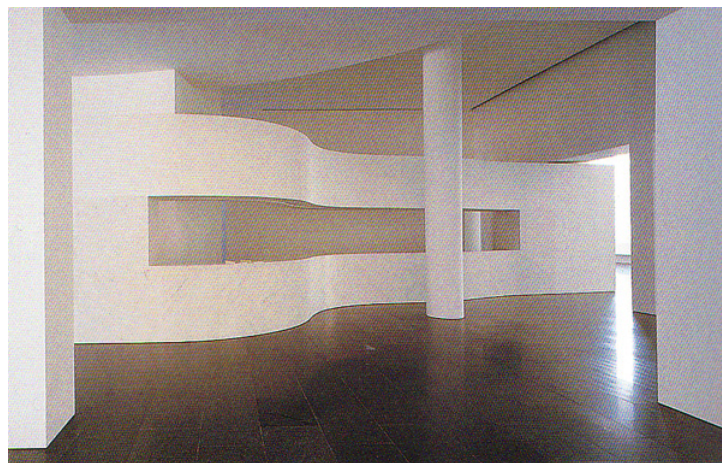


Figure 4-12 the curvilinear marble information counter in the entrance lobby. (Source: Frampton, 2002)



Figure 4-13 the glazed ramp-hall with green glass, gridded mullions, and sun breakers (Source: <http://www.archinform.net/projekte/2694.htm?ID=fb5ee752a0dc68a124c93bc6c43c4627>)

Meier considers the ramp hall as both the main circulation space and the main public space *"The ramp hall, which is primary circulation space, became that public space. You look out to the city on one side and into the galleries on the other side. As you move through the Museum, you are constantly aware of the ramp hall. It provides a space of orientation, a public space, a multi-use space, a space of access and circulation"*.³⁰

Meier dedicated one of the eight bays of the eastern wing for internal stairs, a freight elevator, and restrooms, while the rest of the bays are dedicated to gallery space. There are three principal gallery floors on the eastern wing of the museum that can be accessed via the circulation ramp. These gallery floors, which consist of five bays, are double height, open loft-like spaces. Because these galleries are large and expansive, they can showcase art of various sizes and dimensions.³¹ To enter these galleries, visitors cross over a translucent glass-block corridor-like space whose luminous surface creates a light-saturated environment and marks a linear circulation path leading to different parts of the museum (Figure 4-14). This linear corridor is further defined by columns on both its sides and free-standing half-walls on the gallery side. The columns and free standing half walls on the gallery side of the corridor mark a datum wall that cuts through the building

³⁰ This citation is found in <http://www.arcspace.com/architects/meier/macba/index.htm> retrieved on May 14th 2005.

³¹ These galleries can be divided into sub spaces for temporary exhibition through the use of movable partitions.

from east to west projecting through both sides of the building. On the third floor, louvered skylights above the main galleries illuminate the art below (Figure 4-15). The principal gallery space along with service functions in the eastern wing is not only parallel to the general mass of the Casa de la Caritat behind the museum but has the exact dimension in length.

With regard to the multiplicity of exhibition space, it was Meier's intention to create different exhibition spaces *"It seemed to me that the best approach would be to provide different kinds of exhibition or gallery spaces for the Museum, rather than a repetitive system of spaces, since the artworks to be shown would have different scales at different times - sometimes large, sometimes small, sometimes needing light, sometimes needing no light. So we developed a series of spaces that could accommodate all kinds of activities and exhibitions"* (Dollens, 1997, p.16). As such, the sequence of galleries in the eastern wing is complimented by both a free-form special exhibition gallery at the far end of the southern façade, and two exhibition spaces on the upper floors of the entrance rotunda. As mentioned earlier, the free-form gallery called by Dollens (1997) the 'piano' while labeled by Meier as 'potato-shaped' is compositionally one of the three elements of the southern façade along with the glass box and the hanging wall plane. The 'piano, which projects from the building into the plaza is raised on a column and a wall and can be accessed from the second floor.

The western wing of the museum is the administrative wing. On the ground entry level, the wing contains a shop facing the Plaça dels Angels, a loading area, and a café. The upper floors houses office spaces on seven levels, an education center, and a research library. Office spaces were arranged perpendicular to the datum wall with a linear circulation corridor marked by a transverse wall. On one end of that wall, private bathrooms are placed on the southern elevation, while, a private staircase is placed on the other end. Sandwiched between a transverse wall and the curved wall of the *Paseo* are double height oddly-shaped exhibition galleries on the second and third floors of the western wings intended for small-scale works. Both office and exhibition spaces can be accessed via a bridge that hangs over the *Paseo*.

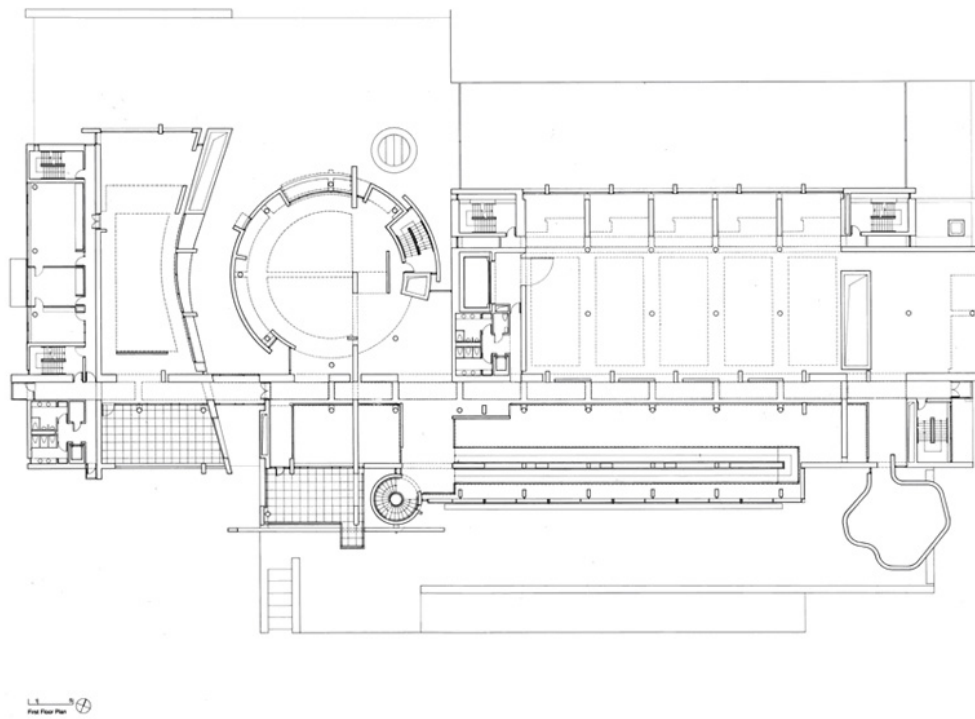


Figure 4-14 first floor plan showing the service bay, the 5 bay gallery spaces in the eastern wing, the 'potato-like' gallery, and the 'oddly-shaped' galleries in the west wing. (Source: Richard Meier's Office)

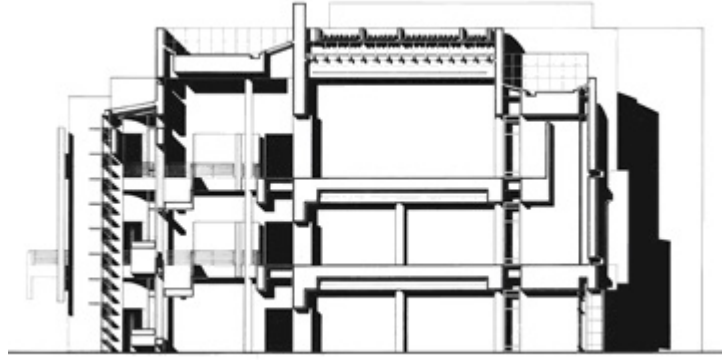


Figure 4-15 a transverse section through the main gallery spaces showing the ramp hall, corridors, and skylight over the third floor gallery space. (Source: Richard Meier's Office)

Meier did not only arrange the functions from east to west, but also arranged functions in linear zones along the major datum wall of the museum beginning with the glazed ramp-hall as the major circulation core followed by a linear circulation corridor marked by columns, the main gallery space, followed by a strip of chamber-like galleries marked by columns on the northern elevation (Figure 4-15).

The northern façade of the museum stands in contrast to the southern façade; instead of reading the elevation as the manipulation of a series of planar screens and elements, the southern façade clearly shows the two wings of the museum building as well as the entrance rotunda in-between (Figure 4-16). The two wings of the museum are clad with Meier's white enameled-aluminum panels while the rotunda is finished in white concrete. The ground level gallery on the eastern wing has full screened glazing to the outside while upper part of the elevation is fenestrated by two horizontal strips of windows giving light to all-divided gallery space behind them. These horizontal strips are penetrated by projecting beams. Above the window fenestrated wall eight fins project adding further articulation to the façade. The eastern wing is a blank white enameled-aluminum paneled wall with a single strip of horizontal windows penetrating the top part. The entrance rotunda is well articulated where the base of the cylinder at the ground level is recessed and glazed echoing the gazing of the gallery space while the upper part of the cylinder is of white stucco articulated with some glazed openings. A wall projects from

the rotunda indicating the 90 degree wall perpendicular to the main geometry of plan mentioned earlier (Figure 4-17).

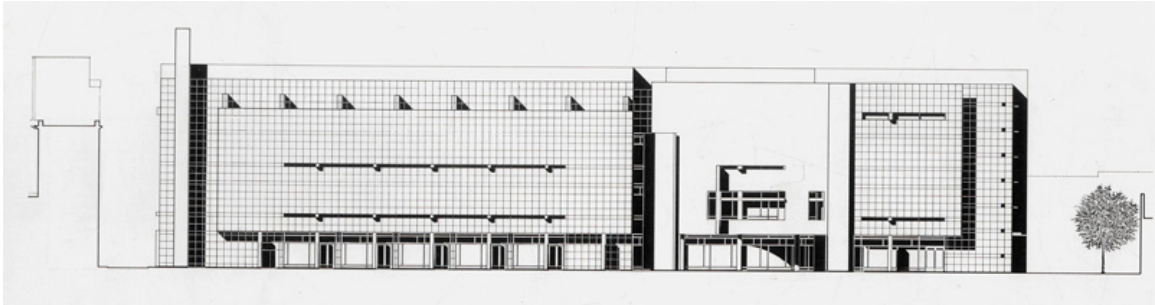


Figure 4-16 the northern facade with the entrance rotunda sandwiched between the two wings of the museum. (Source: Meier, 1997)



Figure 4-17 the entrance rotunda: a: the articulation of the entrance rotunda, b: the white stucco of the rotunda versus the enamel panels of the wings. (Source: Meier, 1997)

4.3.3 Formal Description and Analysis

To engage the formal analysis of the museum, a remark by Richards (1993) concerning the work of Richard Meier in his article *interactive language* published in *Architectural Review*, can be used as starting point. In that article, Richards noted that along with the Arp Museum (1990), the Barcelona Museum of Contemporary Arts shares the theme of building as a wall; through its linear configuration, the free standing

museum building acts as a wall that defines the new Plaça dels Angels in-front of it (Figure 4-18). This wall is generated by the introduction of a new type of exhibition space to Meier's language: the linear gallery.³²

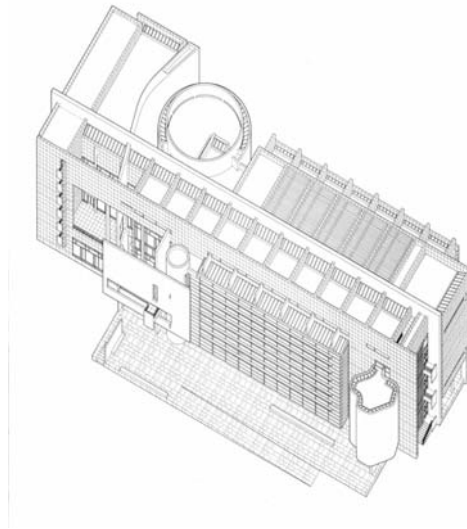


Figure 4-18 the museum as an animated wall defining the plaza (Source: Richard Meier's office)

4.3.3.1 *Formal Composition*

Meier's linear configuration is clearly expressed through the planar geometry that defines the plan composition, systems of movement, and spatial organization of the museum. This linearity is extenuated through the wall that slices through the plan from east to west. This datum wall, as labeled by (Richards, 1996), not only defines the main circulation system i.e. glass-lensed circulation paths that run along the whole length of the building, but also defines the linear gallery configuration in the main exhibition floors in the east wing (Figure 4-19). In the third dimension, the wall is emphasized by its height where it projects over the rest of the building and extends over both sides of the

³²In this project, Meier departs from the cubic gallery spaces that anchored his museum designs in Frankfurt (1985) and later in the High Art Museum in Atlanta.

building on the east and west elevations. As mentioned earlier, the wall acts as a background for a series of figures that animate and articulate the façade. This major datum wall is cut through by the *Paseo* and intersected, in plan, by another transverse wall at 90 degrees. This minor wall directs main visitor's movement perpendicular to the main datum wall.

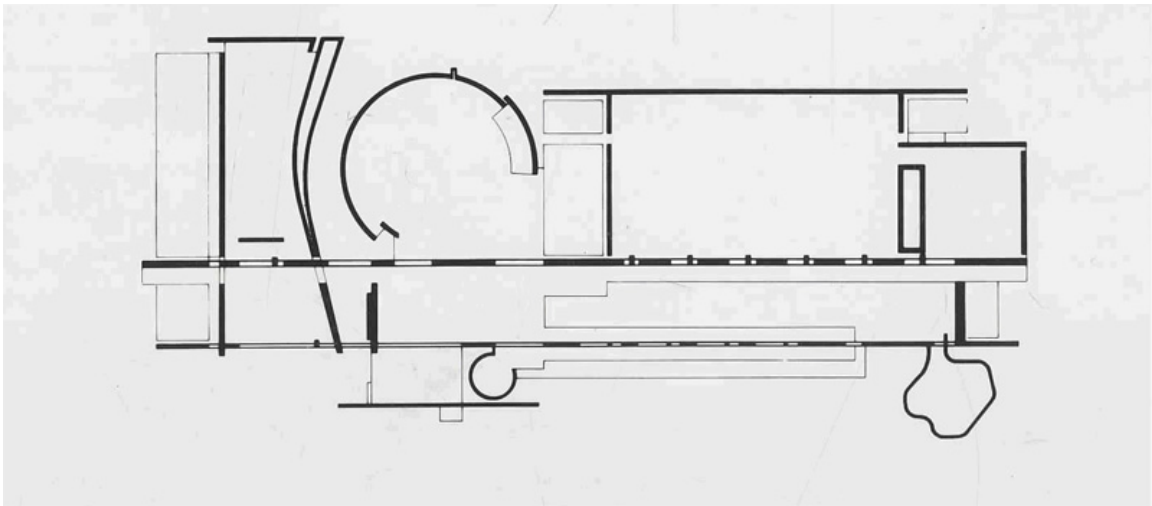


Figure 4-19 the planar elements defining the major zones of the plan (Source: Meier, 1997)

The linearity of the building is further strengthened by a number of planar elements that run from the front southern façade to the back northern façade; from the exterior, the wall of the small exterior balcony projecting from the hanging wall marks the first of these planar elements followed by the hanging wall over the entrance, and then the transparent wall of the glass ramp hall with. These planar elements are set against the exterior wall of the museum that is set against the major datum wall. This use of planar elements makes the overall form of the museum appear as a series of white reliefs as can be seen in the isometric in Figure 4-8.³³

³³ These series of white reliefs or planes refer directly to European modernist legacy i.e. Le Corbusier's Cité de Refuge and Mies' legacy, through his pavilion, in Barcelona (Richards, 1993, 1997).

A closer look at both the plan and the isometric of the project reveals that the museum appears not only as a series of white reliefs but also as a series of cubist forms that are arranged against the wall. As such, the wall as a design element does not only define the main circulation within the museum, or defines the linearity of the composition but it is a device that acts as a datum line holding together the different parts of the plan composition: an entrance rotunda and two rectangular blocks on the northern facade, and a spiral stair case within a cylindrical form, a free form special gallery space, and an hovering entrance plane on the southern façade (Figure 4-20). This leads us to an interesting motif in Meier's formal composition: the interplay between the wall, the circle, and the rectangular block that seems to appear in many of Meier's designs e.g. The ARP museum project, the Ulm Exhibition and Assembly Building designed in 1986.

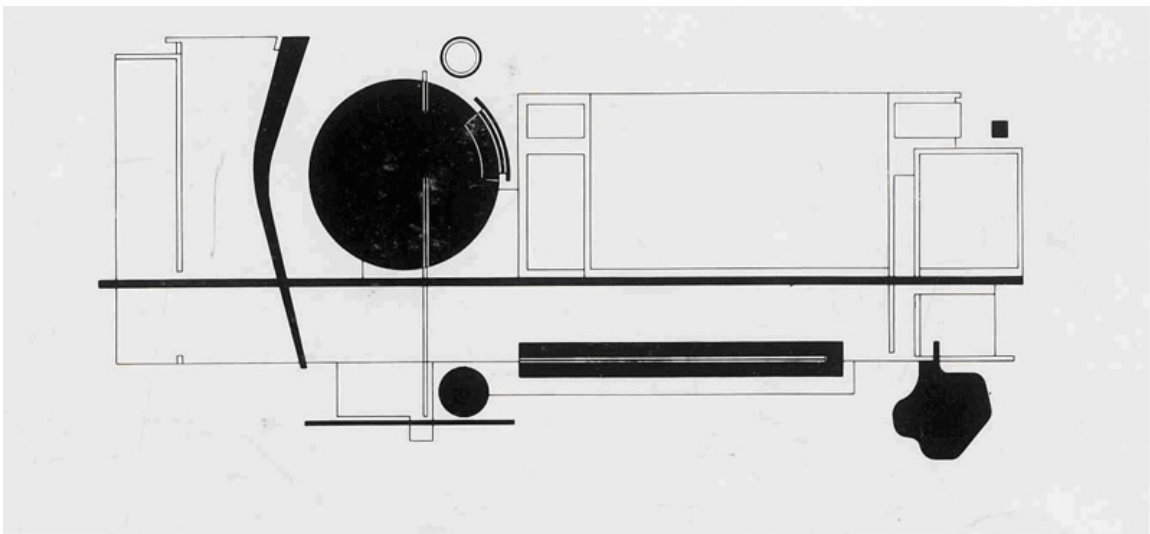


Figure 4-20 the wall acts as a datum line that holds different 'objects' or forms together. (Source: Meier, 1997)

Meier used this interplay to organize the programmatic requirements of the his design; the wall defines the main circulation system, the two building blocks appearing on one side of the wall house functional requirements, and the circle housing the main entrance lobby at the ground level. Within this interplay, the circle does not intersect with the main building blocks, or the major datum wall; it is placed between the two wings of

the museum and only echoed through the curved wall to its west marking the *Paseo* and crossed by the secondary transverse wall further establishing its role as the entrance lobby. Nevertheless, the whole composition is an expression of dynamic equilibrium despite the asymmetrical design.

Accordingly, in the northern façade, the cylinder of the rotunda does not break the building block but is juxtaposed along with the eastern and western wings against the datum wall. On its own, the cylinder is not a static element: it is animated by a curved wall that offsets the main structural columns supporting the cylinder on the ground floor marking the stairs near the eastern wing; the lower part of the cylinder is of recessed glass while the top part is solid white stucco supported on round columns and articulated by glazed openings and a wall segment the marks the secondary transverse wall on the second floor. The external finishing of the cylinder with white stucco, along with its animation, stands in contrast with the two wings, which are clad in aluminum panels and fenestrated by strip windows (Figure 4-21). This strengthens the role of the rotunda as a figure that dominates the foreground, while the rest of the building along with the main datum wall acts a background to the rotunda.



Figure 4-21 the rotunda between the two wings of the museum. (Source: Meier, 1997)

4.3.3.2 *Modularity and Proportion*

Meier's language emphasizes modularity, measure and geometrical order (Rykwert, 1984; Frampton, 1991; Cassarà, 2005). This is apparent in the modular cladding of his buildings, in the expression of the structural grid as an element of visual composition and also in the manner in which Meier's publications deploy diagrams in order to interpret the buildings for the viewer. However, the underlying geometrical order is offset by the arrangement of seemingly independent figures or formal fragments, so that we are invited to look more closely and not to take measure, modularity and proportional order that are taken for granted. Following we will take such a close look at one of the most fundamental aspects of Meier language, the creation of a rigorous geometrical order.

The series of reliefs and forms are not randomly composed; the plan of the museum reveals a system of coordinates on which it has been laid out as can be inferred from the plan of the museum. Thus, one may argue that the plan has a regulating module, or grid. As can be seen from Meier's diagrams, the overall form of the museum, from both edges of the datum wall, along with the edge of the plinth, which the museum rests on, falls within the geometry of two nine-bay squares agitated to the left of the central axis by the rotunda (Figure 4-22). Nevertheless, this diagrammatic representation provided by Meier does not fully uncover the regulating module of the museum nor does it reflect the actual geometry used to regulate and structure the plan. The diagram suggests an intension towards geometrical order but is very sketchy and elliptic as far as revealing the order is concerned. In this sense, the diagram constructed in this thesis can be seen as more complete and demonstrations of the principles of order used by Meier. In addition, they can be seen to be grounded in the main relationships foregrounded by the design, rather than on arbitrarily chosen design element.

In order to uncover the module, the ground floor plan of the museum was redrawn and sixteen centerlines, marked in grey as can be seen in (Figure 4-23), passing through the main structural elements perpendicular to the x-axis were drawn. The distance

between the centerline is 24 ft. This ‘structural’ module does not continue all through the building; it disappears where the rotunda intersects with the plan, and furthermore, it does not pass through any structural elements in the western wing of the museum, and oddly enough, the transverse wall does not fall on the structural module; rather there is a 9 ft. offset between the transverse wall and centerline 6.

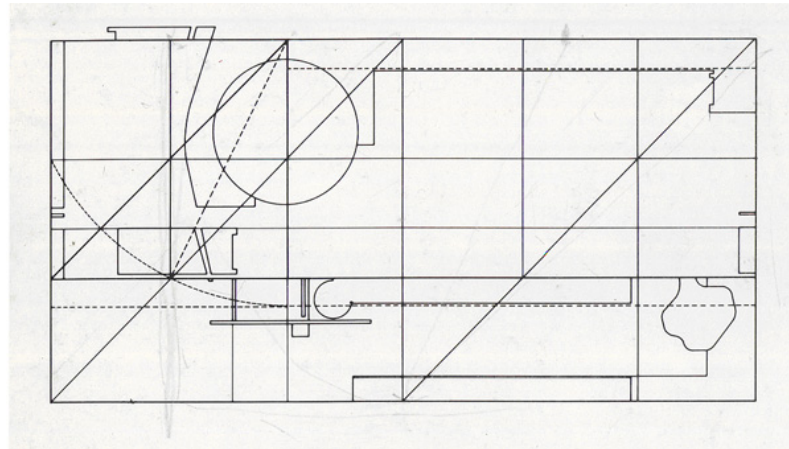


Figure 4-22 the overall layout of the museum within two nine-square squares as presented by Meier.
(Source: Meier, 1997)

Taking a closer look at the plan, one would notice that there are two sets of rectangular columns that seem to have regular intervals but do not fall on the structural module: the rectangular columns under the datum wall and the rectangular columns on the northern façade. Centerlines were drawn passing through these rectangular columns as shown in Figure 4-24. These centerlines shown in orange have the same regular interval of 24 ft. but are shifted from the ‘structural’ module by 9 ft. Both the transverse wall passing through the building and the wall defining the circulation corridor in the west wing perpendicular to the datum wall fall on this module where the transverse wall falls on centerline 6’ and the circulation wall falls on centerline 2’. Furthermore, the structural columns in the west wing fall over this module i.e. centerline 1’.

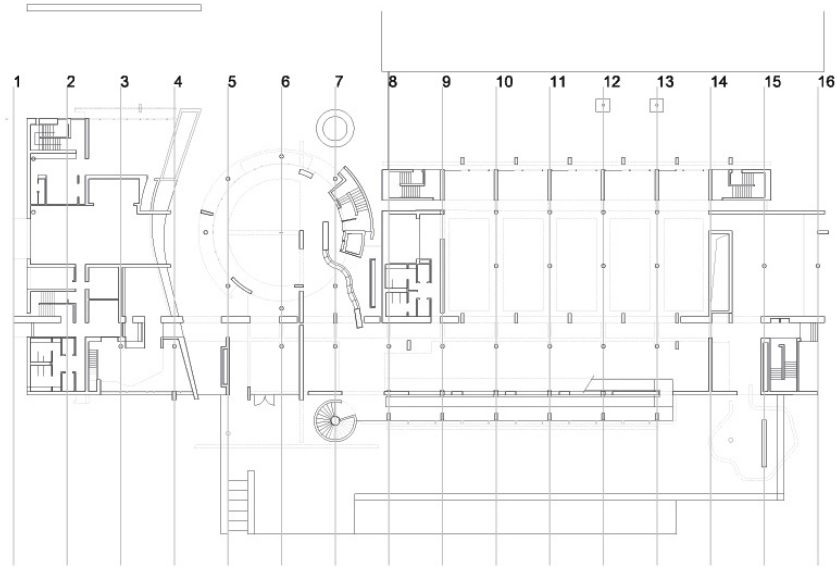


Figure 4-23 the 24 ft. module regulating the structural centerlines of the museum (Source: Author)

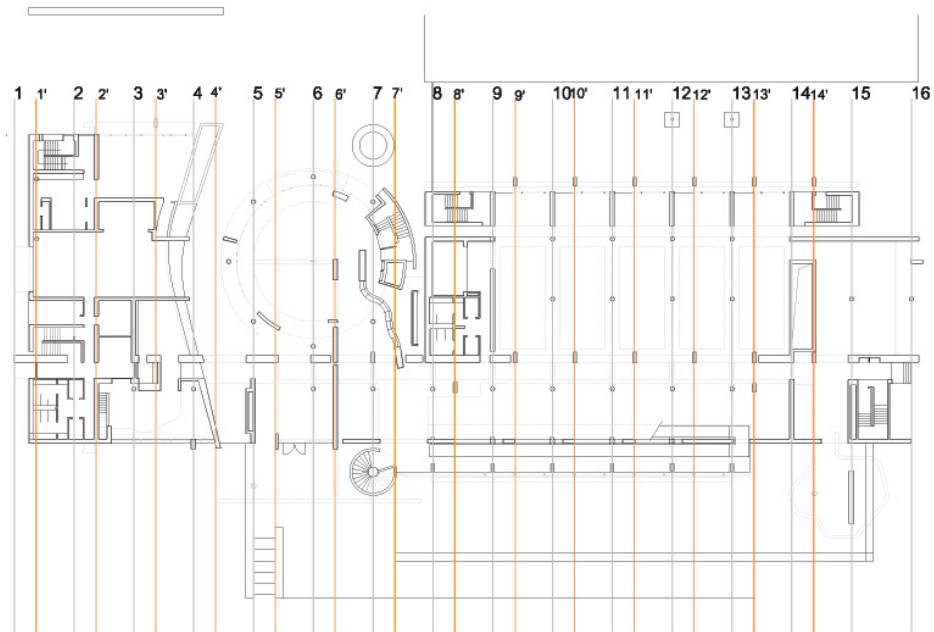


Figure 4-24 the module that passes through the rectangular columns has also a 24 ft. interval but shifted from the structural module by 9 ft. (Source: Author)

These two grids are made evident in the site plan of the museum in both the paving of the plaza in-front of and at the back of the museum, and the roof plan where the main structural beams are exposed in the building (Figure 4-25). The plaza in-front and

around the museum is paved in a primary regular grid of 24ft×24ft where the lines of the grid are marked by wide paving. This paving marks the lines of the structural module. A secondary paving grid with narrow lines, also with a regular grid of 24ft×24ft marking the overlaid grid, shifts from the primary grid by 9 ft. along both the X and Y axis.

The interesting question that arises here is where do these dimensions come from? The answer to this question comes from knowing that the interval between the centerlines is 24 ft. and the shifted distance between the ‘structural’ module and the ‘overlaid’ module is 9 ft. are derivatives of 3 ft. and knowing that the dimension of the aluminum panel used for cladding the facades of not only this building but many of Meier’s other buildings is 3 ft.x3 ft. then one can correctly argue that Meier used the 3 ft. module as a basic module regulating the plan. This can be clearly seen in Figure 4-26 where a 3 ft. module is laid over the plan.

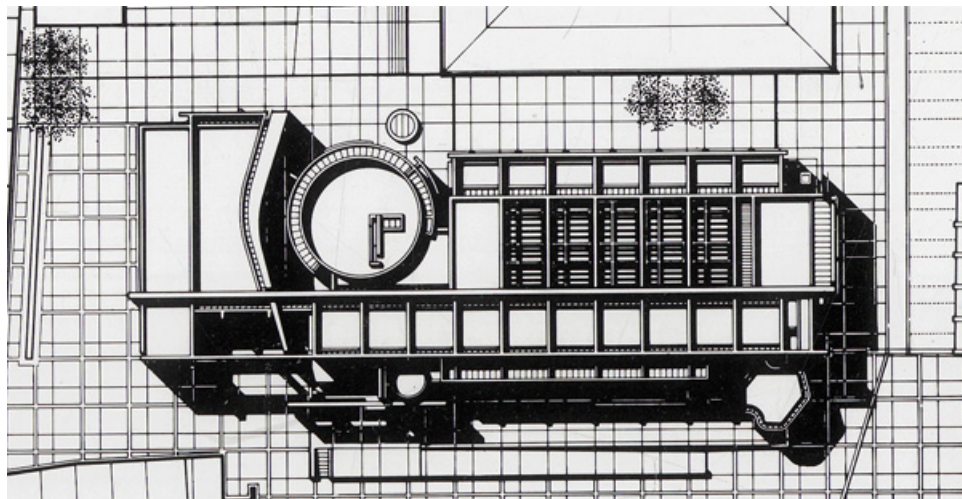


Figure 4-25 the site plan of the museum where the underlying modules regulating the design of the museum are expressed in the paving and the projected structural beams. (Source: Meier, 1997)

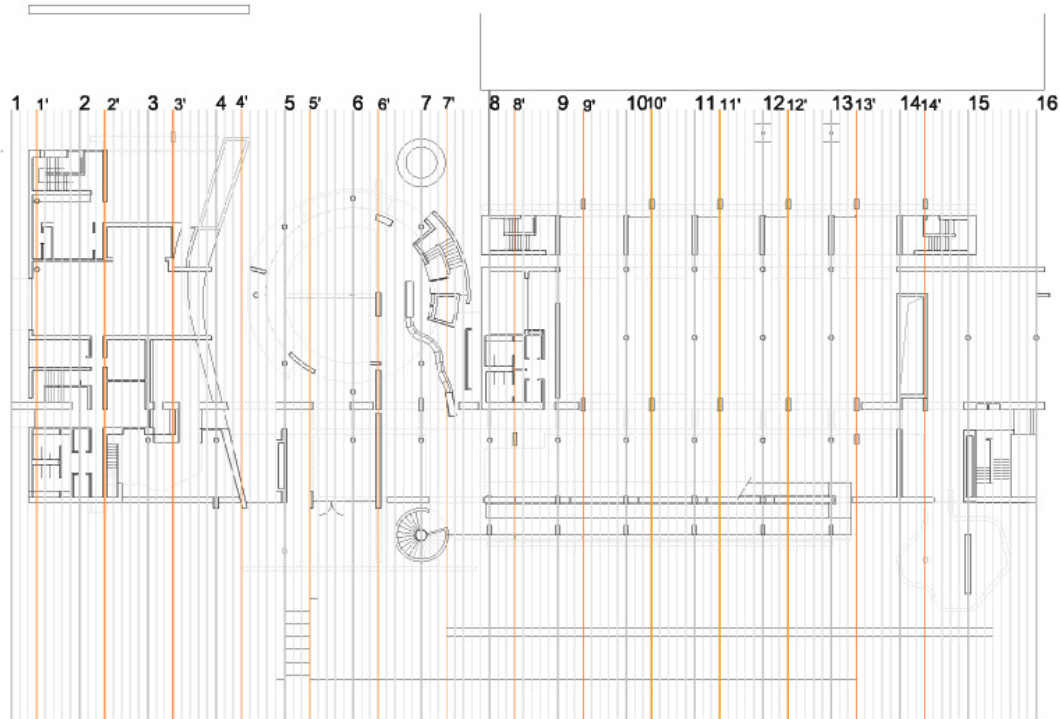


Figure 4-26 the basic 3 ft. module that regulates the plan of the museum (Source: Author)

Thus, one can argue that Meier used a module of 8 units (8 3ft. units) to determine the intervals of the ‘structural’ module and the ‘shifted’ module. Interestingly enough, the length of the eastern wing has the exact same dimensions as the Casa de la Caritat behind the museum. Thus, the dimensioning of the eight bay structural modules in the eastern wing was derived from the Casa de la Caritat.

In order to determine the module perpendicular to the y-axis, six centerlines were drawn through the major structural elements found in plan starting from centerline **A** passing through the rectangular columns on the northern façade and ending with centerline **F** passing through the outer wall of the southern façade (Figure 4-27). The distance between centerlines **A**, **B**, **C**, and **D** is 24 ft. which shows that Meier used the same interval of 8 units to locate the centerlines perpendicular to the y-axis. Between centerline **D**, passing through the datum wall and **E** passing through the inner circular columns of the ramp hall the distance is 12 ft. or 4 units which is half the intervals between the other centerlines. Thus, perpendicular to the y-axis between centerlines **A**

and **E**, Meier maintained his basic grid of 3ft.x3ft. Oddly enough, between centerlines **E** and **F**, the distance is 21 ft. or 7 units. The question that arises here is how did Meier make a one unit shift-from 8 units to 7 units, to locate centerline **F** marking the outer wall of the museum?

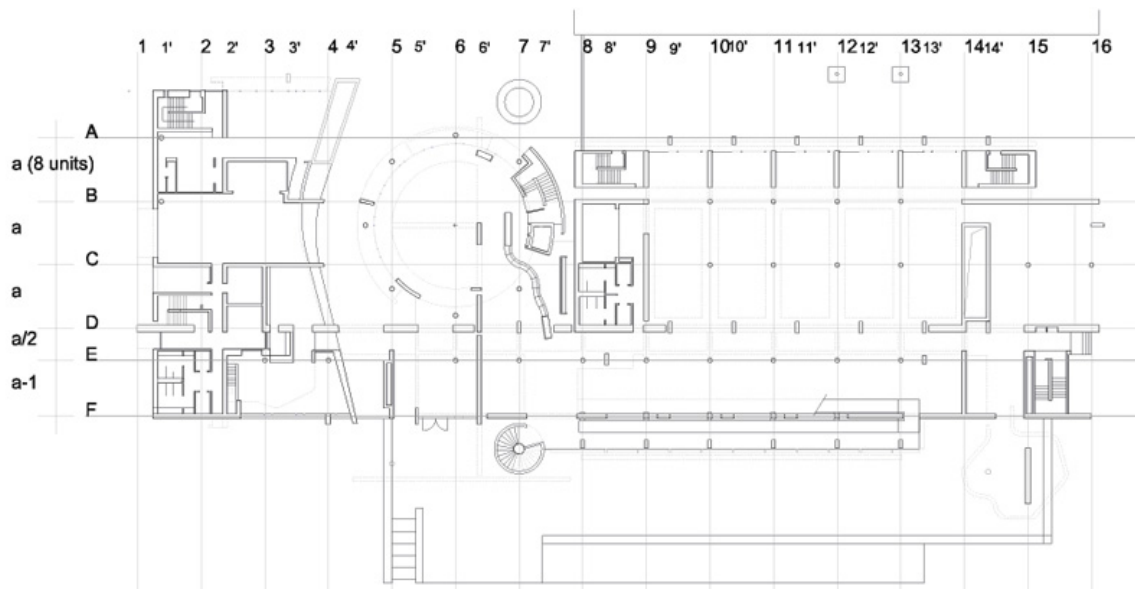


Figure 4-27 the module perpendicular to the y-axis (Source: Author)

Knowing Meier's knowledge and use of geometry, one would anticipate that this change in the module is not random, and is based on some kind of geometry or proportion. Accepting that the spinal wall acts as a datum line for the design of the museum, one would expect that centerline **F** was located not in relation with centerline **E** but with relation to centerline **D** passing through the datum wall. Offsetting centerline **D** creates between centerlines 1 and 2 would create a square of 8x8 units, and then drawing a circle with its center on the intersection of centerline **D** and centerline 1 passing through the opposite corner of the created square would intersect with the outer wall of the museum (Figure 4-28). The geometry used here to locate the outer wall of the museum and accordingly centerline **F** is the proportional percentage of $1:\sqrt{2}$ advocated by Alberti in the 15th century. Thus, Meier used a proportional system to locate the centerline that does not follow the regular module of grid.

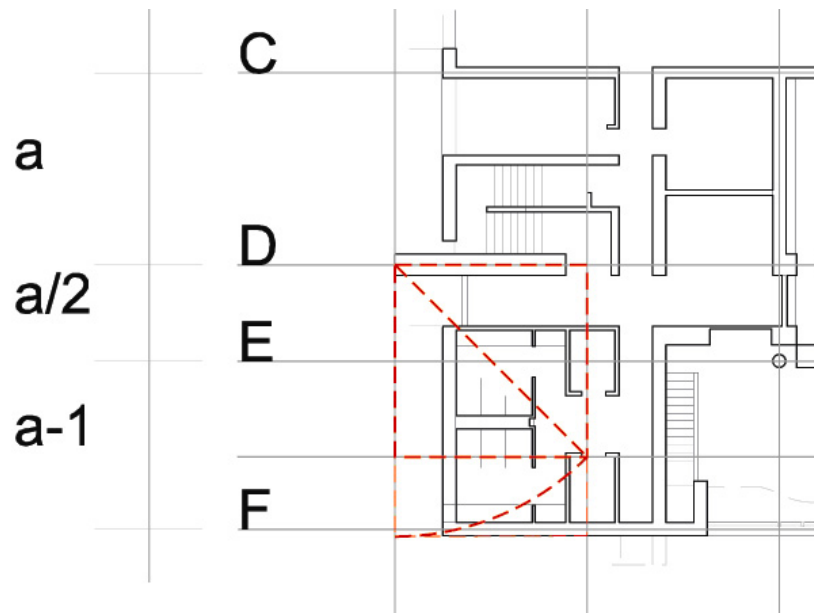


Figure 4-28 Meier used the proportion of $1:\sqrt{2}$ to locate the outer wall of the museum and accordingly centerline F (Source: Author)

This raised another interesting question: if Meier used a proportional system to locate centerline F, did he use other proportional systems to locate other centerlines of determine the geometry of the layout and regulate its structure and could the use of geometry and proportional systems account for the shifted module? This prompted further investigation of the plan to determine other areas where proportional systems were used. Through a process of drawing proportions, the thesis found that underlying the formal structure of the layout, different proportional systems where used to locate and determine the measurements of the major design elements used in the plan.

The overall layout of the museum is laid over a grid of 15x5 units with a regular module of 8x8 units starting from the edge of the building on the northern façade and ending the edge of the ramp hall on the southern façade. The eastern wing containing the main exhibition halls is made of 8x5 units, thus conforming to the golden section proportion. The location of the transverse wall is determined by drawing a golden section from centerline 8. Thus, the ‘shifted’ grid reflected in the rectangular columns originated from the location of the transverse wall. The center of the circle is determined by drawing

a golden section from centerline **D** and centerline 6. The radius of the circular columns marking the base of the entrance rotunda is 24 ft. or 8 units. The inner edge of the rectangular columns on the outer side of the ramp hall is determined by using the proportion of $1:\sqrt{3}$. Figure 4-29 shows the totality of these geometries and proportional systems.

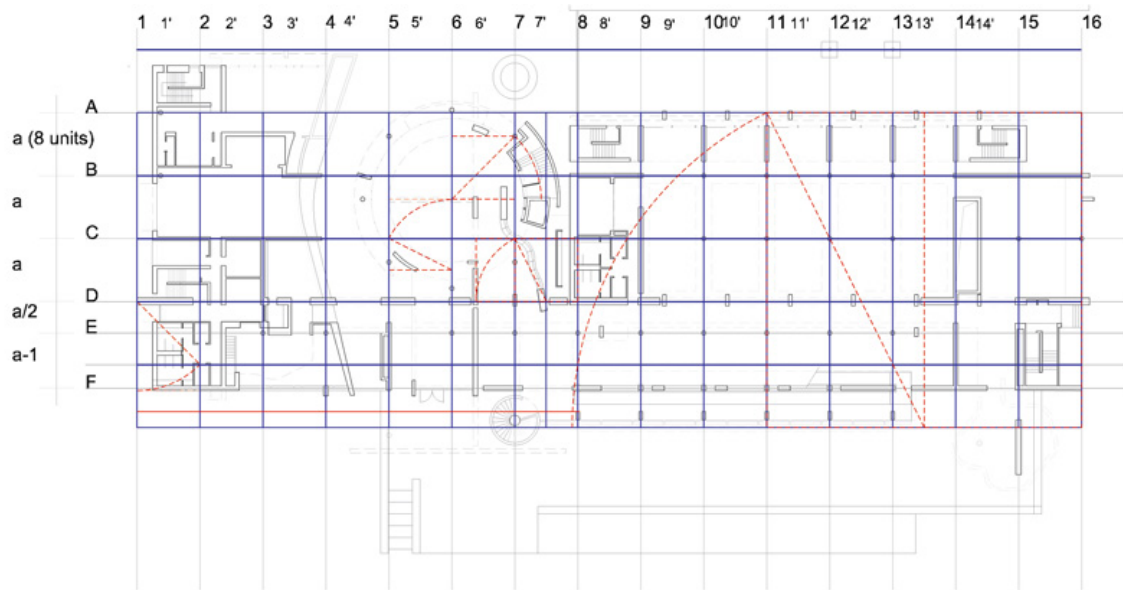


Figure 4-29 the geometries and proportional systems regulating and organizing the layout of the museum (Source: Author)

Thus, underlying the design of the Barcelona museum of Art, there is an organizing modularity that is based on the 3ft.x3ft. (1unit) cladding panel that Meier uses in his buildings. Over the basic module of 3ft.x3ft., perpendicular to the x-axis, there are two modules: the structural module of 8 units and a ‘shifted’ module of 8 units. Perpendicular to the y-axis, the centerlines of the structural elements also follow the 8 unit module except for the centerline of the outer wall of the museum that was determined using the $1:\sqrt{2}$ proportional system. The overall geometry of the layout as well as location and dimensioning of the main design elements, was structured through the golden proportional system and the $1:\sqrt{2}$ proportional system.

The modules Meier used to regulate the plan are explicitly expressed in the design of the two main elevations (Figure 4-30). The cladding of the elevations with the white aluminum panels clearly demonstrates the ordering basic module Meier followed in his design especially in the design of the two main facades: horizontally from east to west, the southern façade is clad with full panels of 3ft×3ft each maintaining the basic grid. Vertically, Meier maintains the overall division of the grid of 3ft×3ft but introduces six horizontal strips of 1.5ft×3ft (1/2 unit×1 unit) so that the rhythm of the elevation goes as ½ unit, 4 units, ½ unit, 2 units, ½ unit, 4 units, ½ unit, 2 units, ½ unit, 4 units, ½ unit, and finally 7 units. Six vertical fins that project over the glazed ramp hall mark the ‘structural’ module on the southern façade. The ‘shifted’ module is expressed on the southern façade by five main aluminum mullions on the glazed ramp hall, while the horizontal mullions follow the module of the cladding panels. On the northern elevation, eight fins on the second floor of the exhibition wing, along with the edges of the load bearing walls that are clear through the glass on the ground floor, mark the ‘structural’ module. The ‘shifted’ module is expressed through five beams projecting from the window strips and seven rectangular columns on holding the projected plane of the exhibition halls.

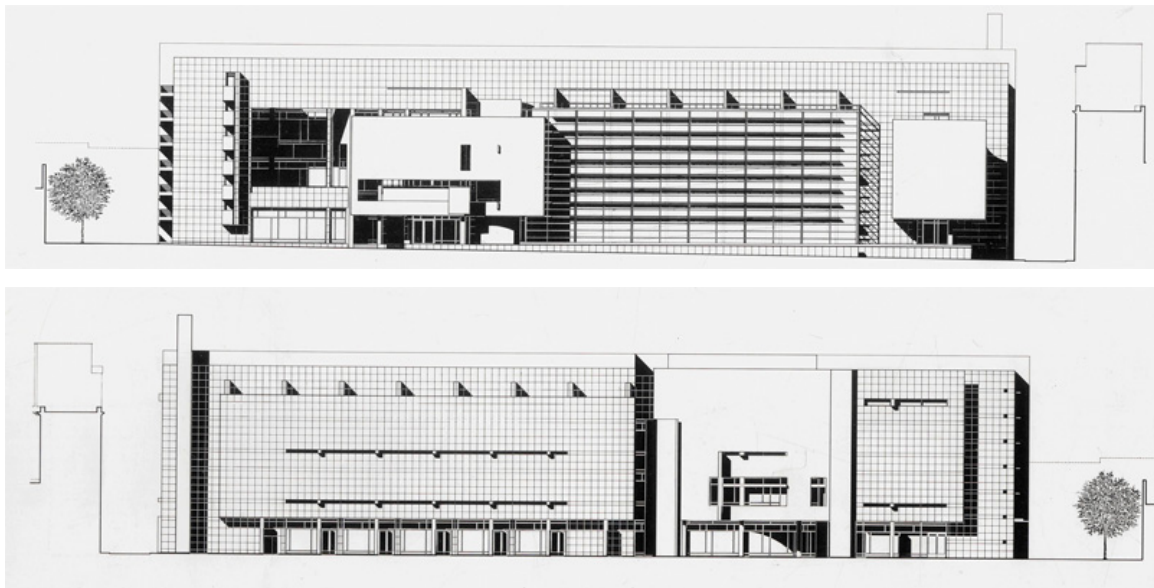


Figure 4-30 southern elevation on top and the northern elevation expressing the modularity of the layout of the museum (Source: Meier, 1997)

4.3.3.3 *Layering*

The series of white reliefs clearly expressed in the plan and facades of the museum, takes us to another theme in Meier's design of the museum; layering. In *Builders of New Museums* edited by James Steele (1994) the commentary on The Barcelona Museum noted that *"possibly the most striking feature of this exhibition sequence is the layering of space from the louvered ramp hall to the double-height gallery running the full length of the northeastern façade. Visitors must cross over full-height light slots, complete with glass-lensed floors, in order to enter the main galleries or pass from these to the main viewing balconies."* (Steele, 1994, p. 131). Thus, Meier's use of planar elements was not for aesthetic or geometric purposes only, it was rather used to organize the plan and structure the space in zones that have to be transversed in order fully experience the building. Once expressed in the third dimension, these functional zones become spatial layers marked by the walls and planar elements that can be either experienced visually where, for instance, through the large glass panel, one can, from the Plaça dels Angels, see into the ramp hall and further across to the museum, or through movement where one has to cross through under the entrance plane into the lobby and then back walk under the glass-lensed corridors to the ramp hall. From there, one has to cross the corridors, walk by the free standing walls into the main galleries and finally reaching the main viewing balconies inside (Figure 4-31). Through the use of planar elements, the different functional zones Meier created in the plan, these zones were translated into visual layers that can be read from the overall form of the building.

Layering is most transparent of the two side elevations (Figure 4-32). On the eastern elevation, one can read the "piano-like" gallery space played against the outer wall of the museum that extrudes beyond the side elevation. Then the major datum wall projects from the top and the side elevation as a dominant element and separated from the opaque elevation of the galleries behind by vertical slit windows. In return, the opaque gallery elevation is separated from the wall marking the beginning of the special chamber-like galleries also by vertical window slits emphasizing the planarity of the wall. Finally, Meier separates the external wall of the northern façade from the mass of the

stairs through extruding the wall beyond the side wall of the staircase and introducing the vertical window slits again.

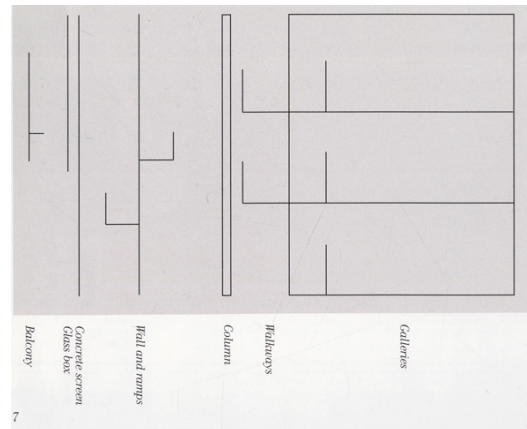


Figure 4-31 the planar elements defining the different layers of the museum (Source: Meier, 1997)

On the western elevation, Meier follows the same strategy where one reads the external wall of the southern façade separated from the side elevation of the restrooms by vertical window slits. The major datum wall is separated from the side elevation of the rest rooms by glass doors leading to hanging balconies and separated from the rest of the side elevation fenestrated by horizontal window strips with offices behind through vertical window slits and projecting beyond the boundaries of the elevation. Finally the outer wall of the northern elevation is separated from the side elevation of the staircase by also vertical window slates.

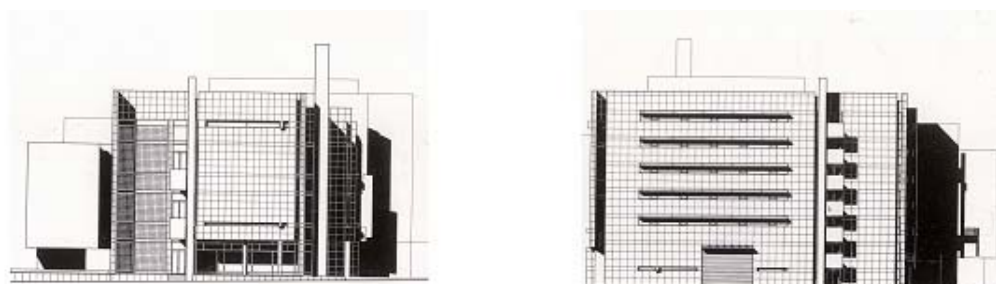


Figure 4-32 side elevations demonstrating the layering of different zones a: the east elevation b: the west elevation. (Source: Meier, 1997)

4.3.4 Concepts that arise from Meier's formal Treatment

As can be seen from the discussion above, the Barcelona Museum of Contemporary Art demonstrates all the characteristics of Meier's formal language. Furthermore, the application of the formal language expresses additional themes and concepts that result from the formal configuration of the building. These themes include: the concept of syntactical or configurational centrality, tension and compression, reversal, and *promenade architecturale*.

4.3.4.1 Syntactical Centrality

Geometrically, a center is “a point or place that is equally distant from the sides or outer boundaries of something; the middle”, but at the same time, a center can further refer to “a place where a particular activity or service is concentrated; a point of origin, as of influence, ideas, or actions; a person or thing that is the chief object of attention, interest, activity, or emotion.” (www.dictionary.com). Peponis (1996) in the Atheneum defined centrality in terms of the conjunction of several properties: the place where most integrated lines intersect (in the case of the Atheneum, it was the columns that marks the pivot for the grid rotation in the building) and at the same, it was the place from which isovists covers practically all the open plan exhibition area. In this thesis, syntactical centrality refers to the creation of a center through the syntax of a composition or configuration made with design elements where activities or attentions can be concentrated.

Syntactical centrality is a prominent feature of Meier's formal design language. In the case of the Barcelona Museum of Art, Meier creates a syntactical center through the intersection of the two perpendicular walls: the datum wall and the transverse wall. Nevertheless, Meier does not place the main circulation ramp at the center; rather, the ramp is pulled towards the exterior to become the glazed ramp hall on the southern façade. Thus, Meier creates tension between the compositional center created by the

intersecting wall, and a functional center through the glazed ramp hall that acts as an atrium and gathering space for the museum, thus extenuating movement experience.

4.3.4.2 *Tension and Compression*

One interesting concept that emerges from the introduction of the circle versus the wall and the rectangle is tension. Tension arises when curves, either in lines or surfaces, are introduced against an orthogonal grid or against straight lines (Baker, 1996).

It should be noted that the notion of tension was used earlier by Arnheim in his book *Art and Visual Perception: a psychology of the creative eye* (1965).³⁴ For Arnheim, each object has field force/s resulting from the geometric and formal characteristics of its structural component parts. If these forces are in equilibrium and in a symmetrical composition, the object is in balance and in a state of rest, if not, the component elements are in a state of tension striving towards a state of equilibrium. According to Arnheim, tension can be generated through the suggested movement of an element in a certain direction i.e. the element seems to be at a momentary phase of an actual locomotion. For instance, columns suggest vertical movement while a rectilinear block suggests movement in a horizontal direction and placing them against each other will create tension. Obliquity, the derivation from the basic spatial movement of horizontal and vertical is another means of creating tension where tension results from the discrepancy between a norm position and an object deviating from that norm position e.g. placing an object asymmetrically in a composition. Tension can also result from the deformation or the distortion of shape of an object from an original perceived state.

In the case of the museum, tension is introduced in three ways: contrast between the generic longitudinal form of the museum and the vertical entrance rotunda; the introduction the curve of the circle against the straight lines of the main datum wall or the

³⁴ In talking about the psychology of art, Arnheim depends heavily on Gestalt theories. This is very clear in his article published in the Journal of Aesthetics and Art Criticism *Gestalt and Art* volume 2, No. 8(Autumn, 1943) pp 71-75

building blocks; and the tension that arises from the surface treatment of the different parts of the buildings where Meier differentiates between the finishing of the main building blocks i.e. clad in white aluminum panels and the wall and rotunda that are finished in white stucco.

Furthermore, the contrast of the solid primary forms set against the glazed membrane creates tension and further facilitates the identification of each of the elements, thus, confirming with Le Corbusier's belief "*that the juxtaposition of primary forms plays a key role in the sensory experience of architecture.*" (Baker, 1996, p.343)

4.3.4.3 *Reversal/Twin phenomenon*

Baker used the term reversal while referring to Le Corbusier and his constant re-evaluation of nature as a source for his work especially in the post war period. Reversal can be defined as "*the development of opposite readings within the same building or the reversal of the roles in elements within a building.*" (Baker, 1996, p. 372) Leupen et. al., (1997) referred to this concept as 'twin phenomenon'. This concept can be manifest in complimentary opposites such as male/female, day/night, transparent/opaque, etc...in the case of the museum, it is clearly demonstrated in the treatment of the northern and southern facades; while the southern façade can be read as a series of forms that are set against a datum wall, the northern façade is read as two solid masses fenestrated by strip windows with a cylinder sandwiched in-between.

4.3.4.4 *Promenade Architecturale*

The concept of *promenade architecturale* was articulated by Le Corbusier through controlling the route towards and into his building to give the participant a sequence of memorable experiences. The concept of *promenade architecturale* is clearly expressed in the design of the museum through the sequence of movement progression and hierarchy of spaces. The entry route using the ramp runs parallel to the longitudinal

axis of the museum exposing a full view of the southern façade. The route then continues along the transverse wall inside the rotunda, to go back towards the glazed ramp hall and then up towards the different floors of the building. As such, one can notice the choreography through the disposition of vertical and horizontal circulation elements across the building.

4.3.5 Section Summary

The previous analysis demonstrated how Meier used elements and themes of his formal language in the design of a specific building. Within the design of the Barcelona Museum of Contemporary Art, Meier used his formal language to structure the program of the museum, where the program of the museum did not force any constraints on Meier, indeed; in this case, the main constraints for the design arise from Meier's reading of the urban context. The building was designed as a linear rectangular block that acts as a wall defining the plaza in-front of it. The linearity of the building was strengthened by the datum wall that not only organizes the different masses of the museum formally, but functionally defines the main public circulation system. This wall was transversed by another wall that marks the main entry to the building. Functionally, Meier separated the different functions in the building to be able to formally express them: a rotunda for the entrance, a rectangle for the exhibition space, and a 'potato-like' form for special exhibition. The functional zoning within the main building block was expressed visually as layers marked by different planes and columns. The formal composition of the museum was structured and organized through a basic modularity based on the 3ft.x3ft. cladding unit and through the use of different proportional systems.

The analysis showed that one of the most important aspects of the formal language of Meier, besides the obvious perceptual aspects of the building, is the regulation and structuring of the layout and facades of the museum through modularity through using grids, proportion, and layering in both the literal and abstract sense. As such, the formal analysis sets the ground for the analysis of the Islip Courthouse building especially when it comes to modularity and proportion.

The next section will supplement the understanding of the formal design language through tracing the development of that language from the outset of Meier's career in the 1960s up until the early 1990s. The aim is to show that Meier's formal language has been consistent but not static; the language has been slowly evolving through incorporating new design elements and design themes, and recycling consistent elements and themes in an innovative manner.

4.4 Tracing the Development in Richard Meier's Formal Language

To trace the development of the formal language, this section will review the major monographs of Richard Meier entitled *Richard Meier: Architect* starting with volume one in 1984 and ending with volume four in 2004 with special focus on the period up until the early 1990s, while at the same time enhancing the review through other publications in various books, journals, and architectural magazines. The section will only focus on projects that are considered seminal in the development of the formal language of Richard Meier as considered by authors and researchers.

In the introduction to volume one of the monograph of Richard Meier, Rykwert (1984) described the early projects of Meier while implicitly sketching some of the characteristics of Meier's formal language. According to Rykwert (1984), Meier's early commissioned designs such as the beach house on Fire Island and his parents' house in New Jersey, where the former reflected Marcel Breuer's style and the latter with its horizontal roofs emulated Frank Lloyd Wright's Falling Water, did not suggest the adoption of a certain style. By the time of the Smith House at Darien (1967) was constructed, Meier's approach to design was beginning to mature; the house was designed as a 'free standing' structure, all in white, with a geometrized approach. Rykwert gave a description of the houses without explicitly stating the characteristics of Meier's approach. The characteristics of Meier's formal approach in the design of the Smith House were stated more elaborately in another book *Five Architects* published in

(1972). Many of the characteristics of Meier's formal language can be traced to the Smith house (Figure 4-33). Thus, it will be presented in greater detail.

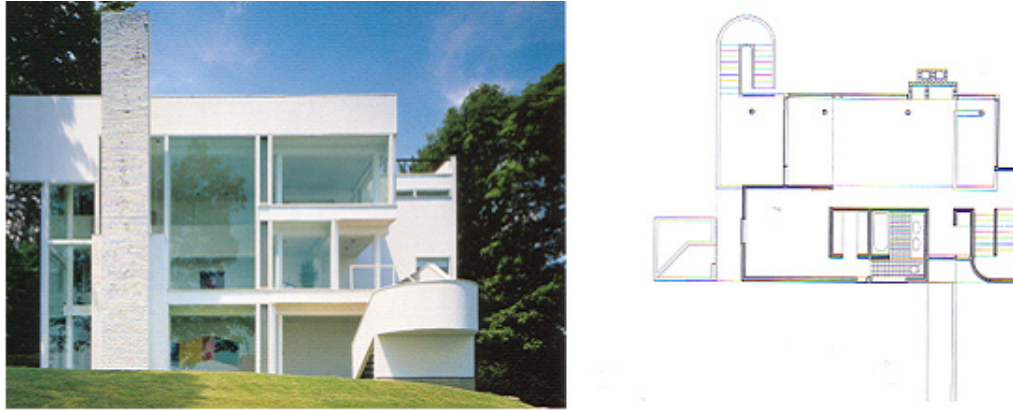


Figure 4-33 the smith house (1967) (Source: Frampton, 2002)

In the commentary about the Smith House in *Five architects*, the concept of the house was described as having two aspects, a characteristic of Meier that remained consistent all through his work, one ideal and abstract, and the other real and analytic. The abstract idea of the house was manifested in the spatially layered linear system with the clear circulation that runs along and across the layers. The real and analytic has to do with issues of site, program, circulation and entrance, structure and enclosure. In order to achieve the spatially layered design, Meier restructured the program into public and private functions that were grouped into two consecutive zones perpendicular to the entrance axis. The functional zones become spatial layers through the vertical stratification of space. Here one can argue that the restructuring of the functional components and the expression of functional zones as layers identified earlier in the Barcelona Museum have originated in the Smith house. The functional division also affected the physical expression of space where the private functions became a series of enclosed 'cellular' spaces, while the public zone is a series of platforms within a single volume with the main circulation corridor mediating spatially between the two zones. The dialectic between 'open' and 'closed', private and public was expressed in the

structure where the private zone is of load bearing walls with openings, while the public zone is of beams and columns with a glass skin overlooking the view.

The house was connected to the site via a bridge at 90° degrees to the ‘entrance’ wall suggesting a frontal approach to the building. Meier created the entrance as a cut through the ‘entrance’ wall, as labeled by Rykwert, creating an element of surprise where the opaque entrance wall hides the space behind but once going through the main entrance, the viewer is surprised by the view seen through the triple volume expansive glass skin. The approach created through the bridge going through the entrance wall and then exposing the external view through the expansive glass creates a *promenade architecturale* that dramatizes the experience of the house. This duality in the treatment of the house reflects one of Meier’s reoccurring themes ‘reversal’ or twin ‘phenomena’, as mentioned earlier.

According to Hurtt (1992), the parti that Meier developed in the Smith House: the restructuring of functions into zones expressed as layers, the duality of the opaque-cellular-closed space and the transparent-open-continuous space; and the frontal approach perpendicular to the layers through the opaque wall as can be seen in Figure 4-34, was continued in the series of houses he designed later such as the Hoffman House (1967), and the Salzman House (1969) (Figure 4-35)

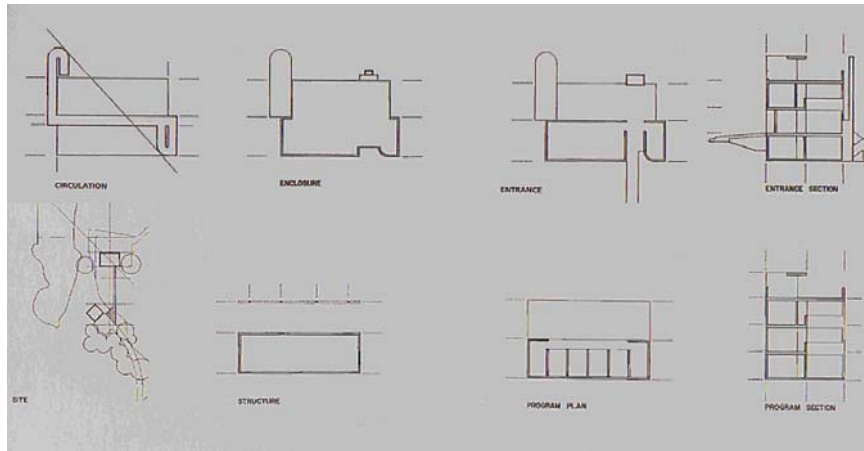


Figure 4-34 diagrams presented by Meier elaborating on the structure and organization of the Smith house (Source: Frampton, 2002)



Figure 4-35 the Hoffman House (left) and the Salzman House (right) (Source: Frampton, 2002)

In the unbuilt house at Pound ridge (1969), Meier's method in design exhibited two concepts that were popular at that time: the pictorial effect of Synthetic Cubism, manifested architecturally through Rowe's and Slutzky's literal and phenomenal transparency, and volume manipulation based on the purist approach in cubism, manifested in architecture through Le Corbusier's promenade architecturale i.e. making and reading three dimensional volumes through movement and creating a holistic mental image of the building through creating multiple viewing angles. These early works also reflect the effect of Le Corbusier's and the 1920s modernism on Meier. This effect is manifested in Meier's 'white' architecture, the use of the 'five points' of Le Corbusier, the deployment of rational composition generated by geometry and proportion, and the

utilization of primary geometrical forms such as the circle and the square and their simple configurations.

According to Allen (1999) these early projects of Meier reflected modernist principles of tectonic clarity, layered composition, and an abstract conception of space; they launched Meier as a consistent modernist architect. In 1972, he was launched as one of the ‘whites’, or ‘New York five’, including Eisenman, Graves, Gwathmey, and Hejduk, that were featured in the publication *Five Architects* (1972).

After the series of houses for private clients, Meier was awarded several public buildings among which the Bronx development Center (1977) was a mile stone (Figure 4-36). The importance of this project stems not from the fact that it carried the characteristics of Meier’s design approach up until that time: the segregation of functions, clarity of circulation, spatial layering, the differentiation of the treatments of the elevations, but from Meier’s first use of metal panels for cladding the elevations of the Center. The cladding metal panels gave the building a grid like quality that Meier varied through a complex rhythm of varying metal panel sizes and its groupings. As these panels were custom made of standard sizes, the rhythms Meier created depended on the grouping of the panels to create elevation grids and window openings. The grid of panels would make the building ‘lucid and ‘legible’ while the variations in the openings and their relationships would give ‘rhythmic intensity’ (Rykwert, 1984, p. 18). The grid like walls with cladded panels and their rhythms would later become a signature characteristic of Meier’s buildings that will be later explored in the thesis as Modularity.



Figure 4-36 the Bronx Center (Source: Frampton, 2002)

Meier's next celebrated building was the Atheneum in New Harmony, Indiana (1979) which Rykwert considered one of his most complicated buildings up until that time (Figure 4-37). The building is designed as a free standing structure over a hill approached by a ramp. The building's thrust over his other projects is exemplified in the clear use of the ship metaphor or analogy through the use of the wall as a sail; the use of shifting grids that are laid over each other, which are expressed in circular structural columns, vertical planes, and the approach ramp; the use of façade panels or layered facades; and the juxtaposing of contrasting shapes over a grid like pattern. In a paper published in 1996 under the title *The Spatial Construction of Architectural Meaning* Peponis gave an extensive analysis of the building focusing on several aspects of the building such as iconography, choreography, and exposing the underlying geometry and modularity of the shifted grids. In the Atheneum, Meier also cladded the building, but this time it was clad in a white, porcelain-finished steel panel a building material that became the signature finish for Meier's buildings.

The next two celebrated projects of Meier were museums: the Museum of Decorative Arts in Frankfurt (1985) (Figure 4-38) and the High Art Museum in Atlanta (1983) (Figure 4-39). In the Frankfurt Museum, Meier won a limited internal competition for the museum. It was one of Meier's first projects where geometry generated the design of the project (Rykwert, 1984). Geometry was derived from the site itself with the Villa Metzler at the corner of the site. Meier devised a macro square made of sixteen smaller

squares each with the size of the Villa. He then created another shifted grid by $3\frac{1}{2}$ degrees with reference to the irregularities of the street patterns in Frankfurt and designed the museum as an L-shape surrounding the Villa. The museum is characterized by the interplay of the shifted grids, interest in light and its manipulation and volumes and their composition, and according to Frampton (1991), Meier's use of the glazed 'ramp hall' against the main wall organizing public circulation and projecting from the outer skin of the museum.

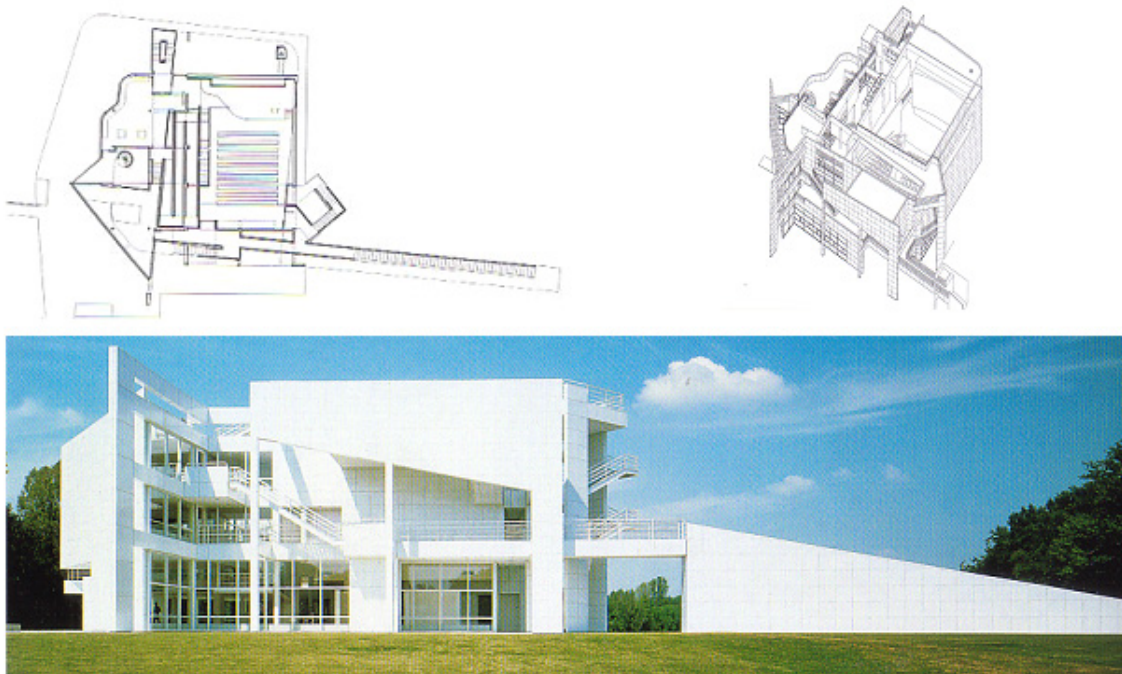


Figure 4-37 the Atheneum was one of Meier's first projects to utilize the shifting grids, modularity, and the cladding with the white porcelain-steel panels (Source: Frampton, 2002)

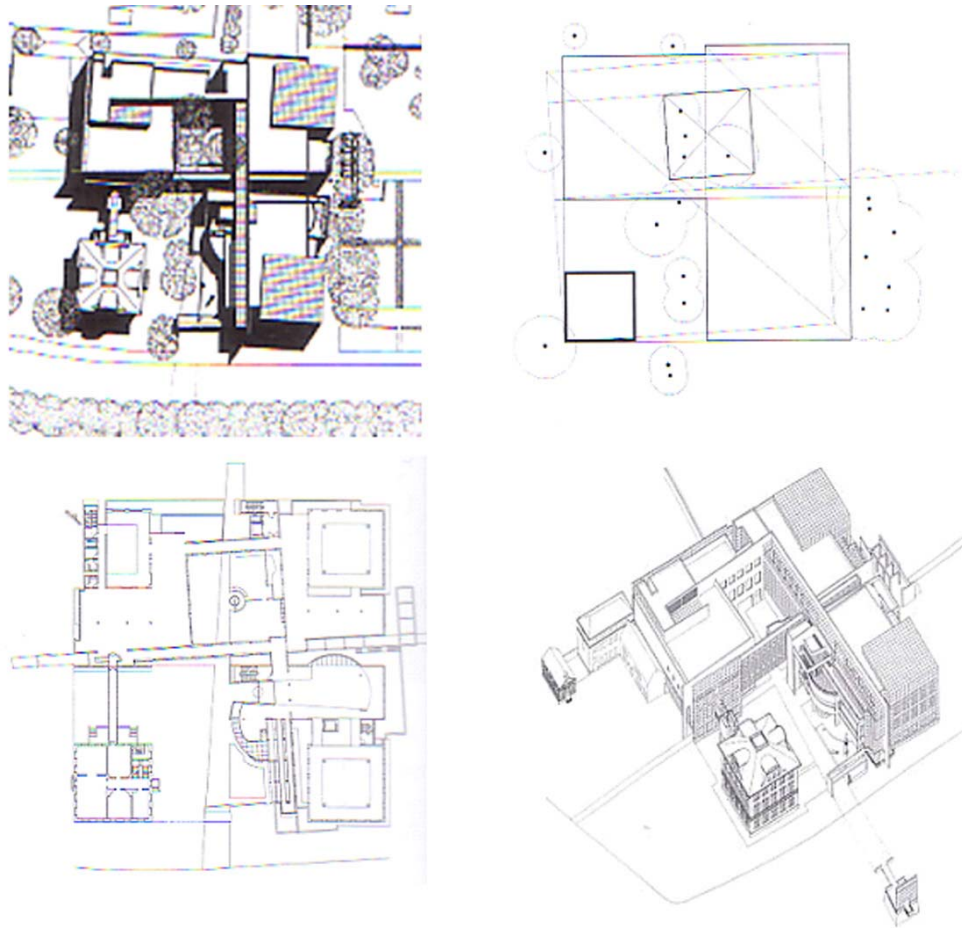


Figure 4-38 the Museum of Decorative Art, Frankfurt (Source: Frampton, 2002)

In the High Museum of Art in Atlanta (1983), Meier continued the employment of the ramp as the main approach to the building. The ramp, diagonal to the site, reaches a top-lit glass-walled quadrant forming the main hall of the museum. The quarter circular quadrant, which connects the two arms of the L-shape of the museum, houses the main circulation ramp that is parallel to the outer glass wall. This ramp is analogic to the ramp in the Guggenheim Museum designed by Wright, thus featuring one of the incidents where Meier refers to a precedent in a museum design. According to Frampton (1991), this was the second time that Meier used the glazed ‘ramp hall’ as the main circulation space. The museum features several of Meier’s characteristic design elements: the use of different grids, the undulating entrance hall, the ramped entry, and the white porcelain cladding.

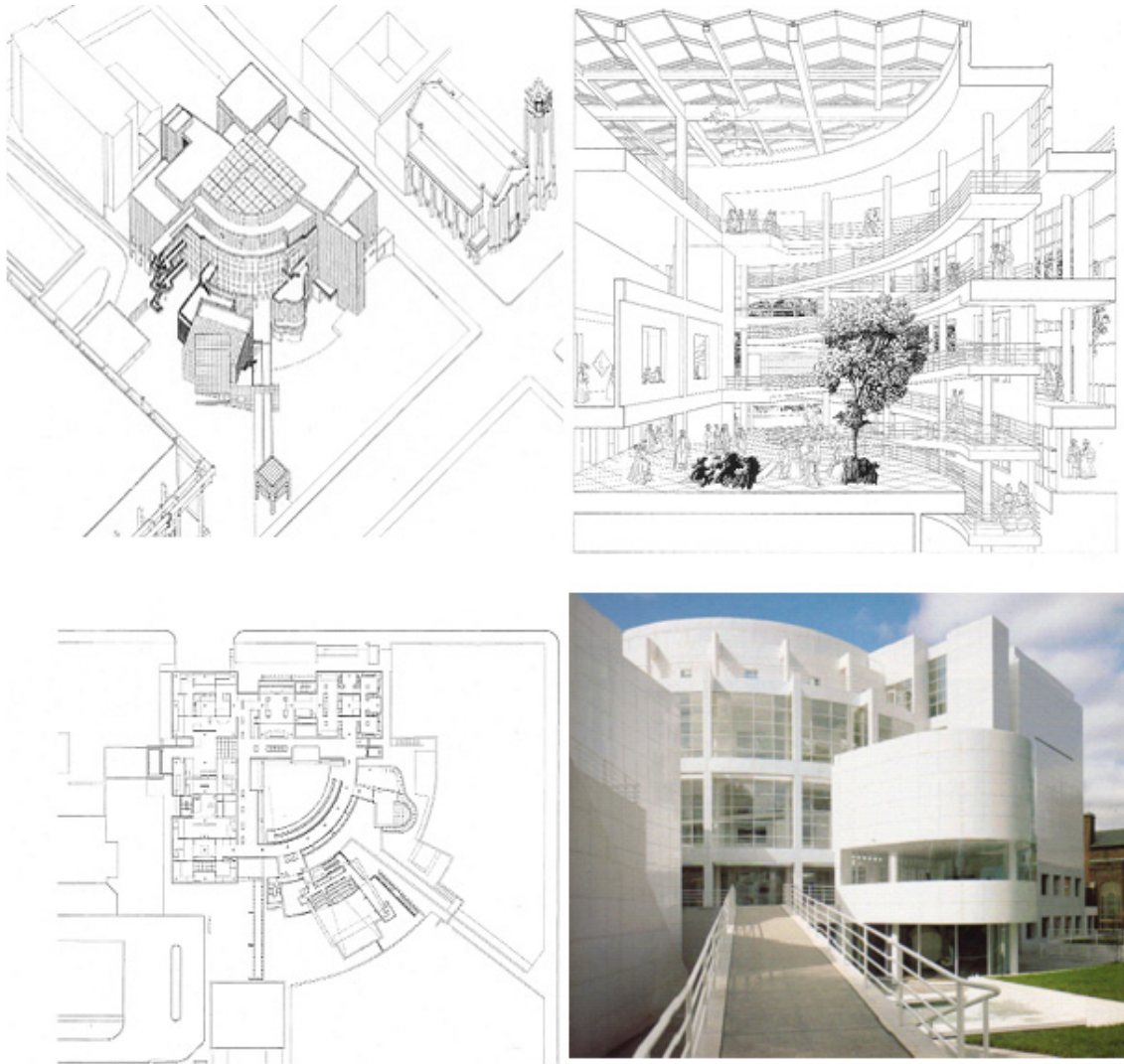


Figure 4-39 the High Art Museum in Atlanta. The museum expresses many of the characteristics of Meier's formal language: the ramped approach (upper left); the ramp as the main circulation element (upper right); the regulating grid (lower left); and the white cladding panels (lower right). (Source: Frampton, 2002)

In volume two marking Meier's work between 1984 and 1991, Frampton in the introduction entitled *Works in Transition* characterized Meier's work not through reviewing his projects, but through identifying design themes and motives that reoccur through different projects. The characteristics Frampton mentioned are summarized as follows: the use of the cylinder or circle as a design element that focused Meier's architecture as manifested in the Ulm project, the Arp Museum competition, the Canal+ headquarters, and the Barcelona Museum of Contemporary Art. The second characteristic is manifested in the use of the glazed ramp hall that externally exhibits internal circulation and indicates the civic nature of the building such as the Frankfurt and Barcelona Museums.³⁵ A third characteristic is what Frampton labeled the 'pin-wheeling' centroid created through the use of a spinal wall transversed by a minor wall at 90° degrees. This characteristic was described in the analysis of the Barcelona Museum in the previous section as syntactical centrality; an idea picked up by Peponis during the analysis of the High Art Museum in Atlanta. A fourth characteristic is Meier's perfection of the enameled panel cladding. A fifth characteristic lies in the development of the concept of layering through oscillating between surface and depth where surface is experienced through the interplay between the cladded white surfaces and translucent glass covered with horizontal louvers, while depth is expressed through the use of several vertical parallel planes that can be either experienced through moving through the building or via the glass surfaces that allow viewing inside that building. Another characteristic of Meier's work during that period was the use pierced wall motif or the creation of openings in solid walls through fenestration.

One of Frampton's (1991) strongest characterizations of Meier's formal language was the idea that his formal composition can be regarded as interplay between figure 4- i.e. the spatial animation of the work, or the forms that are juxtaposed together in his designs, the field i.e. the regulating lines expressed in the modulated surface, or the regulating grids, and the gestalt i.e. the interaction between the previous two. The figure

³⁵ Frampton made an interesting distinction between Meier and Le Corbusier when it came to the use of the ramp: while, the ramp as it appears in Villa Savoye (1929) had a more or less central location, in Meier's projects, it gravitated away from the classical center towards the exterior of the building, thus becoming an externalized glazed 'ramp hall'

and the field can be used to describe how the geometric forms Meier uses interact with the underlying modularity of the building. In Meier's work, the figure/s e.g. the cylinder in the case of Barcelona Museum disturbs the field by standing freely in clear contrast to the orthogonal field of the building demonstrated via the underlying grid and the moduled cladding panels, nevertheless creating a dynamic balance between the two.

In the same volume, Rykwert (1991: p 18-25) talked more about the formal language of Meier mentioning elements such as '*stairwells projecting out of squared white enamel skin*', and '*nautical railings*' that reoccur in different buildings. Rykwert also characterized Meier's layouts as consisting of a '*formal vocabulary*' e.g. cube, cylinders and cones, abstracted from the early modernism and juxtaposed in a collagist manner. Rykwert also noted many of Meier's reoccurring themes such as the use of proportional systems in order to '*absorb the formal intrusions*' of his compositions, the duality that exists in Meier's work between '*insubstantial form on one hand and the demands of program and material on the other*', which Meier resolved through program restructuring, separating structural systems into points and lines, and isolating functional elements such staircases and ramps to become '*emblematic devices*', and the use of geometry devised from the site to generate the complexity of the building such as the Hoffman House, the Atheneum, and the Frankfurt Museum.

In Volume three of Meier's monograph published in (1999), Rykwert under the title *The Third Installment* reaffirmed Meier's attention to the formal aspects of design, the use of formal devices to create compositions of certain '*type forms*', the analytic approach to the program, the marrying of superimposed grids, and the use of proportion. Rykwert also acknowledged that Meier's emphasis on procession to and through the building has matured in the projects designed between 1992 and 1999.

According to Rykwert, the projects Meier have done in the United States during the early 1990s have opened up a new period in Meier's career. Rykwert named the Islip Courthouse building as an example of such works with its rectilinear Block, the gently curved brise-soleil on the southern façade, the northern façade with its fenestrated

windows, the lime stone wall cutting through the building and dividing its functions, and the entrance rotunda expressed as a truncated cone standing in-front of the building announcing its civic nature and importance. It seems here that the Islip Courthouse building was one of Meier's first buildings in the United States to carry the stamps and characteristics of the European projects mentioned earlier in Giovannini's description of Meier's formal language, and thus, Rykwert considered it as marking a new period in Meier's work.

Characterization of Meier's formal language was not limited to the writings of Frampton and Rykwert in the Richard Meier monographs or Giovannini's article about Meier; the development of the wall-form typology where a wall is used as a device that not only organizes the plan and the main circulation but acts as background for a series of forms displayed against it, the juxtaposition and interplay of circles, linear, and rectangular elements in compositions over an invisible geometrical order that unifies the whole composition of a building, the use of the glazed ramp hall, the use of planar elements to structure plans as a series of layers was picked up earlier by Ivor Richards in 1993 as he was describing the Barcelona Museum of Contemporary Art, the Jean Arp I Museum, the Frankfurt Ethnology Museum, and the Ulm Exhibition Hall.

In the book *Richard Meier: Architect* published in 1999, several writers gave descriptions of Meier's work and formal language: Hutt (1999) described his architecture as one where the fundamental concerns of Meier beyond the program of any project are space, form, light, and how to make them, as such, affirming the previously mentioned duality of Meier's work, the interaction between the abstract and the real, and describing his architecture as architecture of abstraction. Hutt further described Meier's language as updated version of the classical orders that abstracts and reinterprets pure architectural forms where the language is "*a set of principles and presets about construction methods, details, materials, and aesthetics.*" (1999, p. 2). She described the units of his syntax as white metal panels, expansive glazing, pipe railing, glass blocks, piano curves, brise-soleil, while the design syntax can be characterized by a collage sensibility that integrates, geometrical site analysis, overlay and application of grids and modular

systems, and the recombination of his form language regardless of building typology. Hutt noted that the forms Meier uses have neither fixed meaning nor a certain range of reference; rather they are merely type and formal devices that evoke meaning depending on the context and their placement in the composition of the project. As such, everything in Meier's work has an instrumental value; a specific position within the system.

Allen (1999) picked up on the instrumentally i.e. employment of means for attaining a certain end, of Meier's approach to design where he stated that Meier organizes his plans and sections through abstract instruments i.e. geometry, modularity and proportions to engage issues of building technology and functional predictions. While describing the Salzman House and the High Art museum in Atlanta, Allen picked up on the issue of Meier's cladding system as implying a '*a complete three dimensional organizing matrix*' expressing the grid that underlies the design of many of his buildings. Allen also attributed Meier's inclination in his early designs and later ones towards '*frontally layered organizations*' that are sequentially organized through parallel planes and *promenade architecturale* to the reading of Rowe's and Slutzky's phenomenal transparency.³⁶

In the same book, Cohen (1999) described Meier's projects as constituting '*ensembles of multiple variations within a voluntarily limited thematic register*' (1999, p.18). Cohen mentioned Meier's use of the plan as a generator of his projects and emphasized the use of ordered geometry to structure the projects through regulating lines, a principle first formulated by Le Corbusier in the 1920s, and the use of the grid:³⁷

³⁶ According to Rowe and Slutzky, literal transparency deals with the optical and physical properties of transparent materials, while phenomenal transparency deals with the effects of simultaneity, interpretation, and overlapping achieved through 2D and 3D organizations. According to Allen (1999), the concept of phenomenal transparency turned into two compositional devices in Le Corbusier's work that were picked up by Meier: the design of the façade that registers the organization of the space behind it, and promenade architecturale, which through the movement through space brings the viewer into contact with planes that structure the space and in return these planes can be mentally restructured as an image capturing the structure of the whole building.

³⁷ During an interview with Jencks (1990), Meier stated that the grid system he used frequently is reflected in both plans and sections in which "the use of white panels is simply an expression of that grid." According to Meier "*the grid not only makes it possible to eliminate the center, but also allows a whole range of spatial possibilities. The grid is an architectural device, a three dimensional, organizing system.*"

“The regulating grid allows him to lay out the entire building on the ground and sets into place a matrix that permits the negotiation of the internal geometries of the project with those of the space in which it is inscribed. The grid becomes an ordering device capable of coordinating the two systems through which Meier conceives the relation between his buildings and their space of inscription: the relation of figure/ground and object/texture.” (Cohen, 1999, p.19)

In a recent publication, Cassarà (2005) affirmed that Meier’s design strategy was formulated during the period of 1961-1965 through the design of his three first houses. This design strategy is exemplified through the Smith House: the scheme of opposite components poised in equilibrium (simple-complex, form-structure, and open-closed): the idea of colorlessness i.e. white to dematerialize structure and construction materials to stress a situation of universality and a-contextual i.e. design linked more to an abstract ideal process and less to real context. As such, Cassarà also confirms to the notion that Meier’s work integrates the duality of the abstract and the real, and therefore, his buildings can be considered abstract and unrelated to their surrounding, thus, asserting the idea that they can be studied as abstract designs.

For Cassarà, Meier does not collide forms; rather the volumes he uses are clearly defined and make the functional organization discernable from the exterior. These forms such as the circle or the straight line, which Cassarà labeled as *‘forms of reason’* provide stable solutions in Meier’s buildings along ramps, stairs and paths. These forms along with the wall, the industrial metal staircases set against a wall, the display of forms against the linearity of the wall become archetypes in Meier’s designs according to Cassarà. Furthermore, the juxtaposition of forms in his buildings is regulated by the mathematical angles of the grids on which the forms expressing functional components are implanted, thus, affirming Meier’s geometric rigor that is augmented by colorlessness and abstraction.

(1990, p. 24) As such, Meier regards the grid as a tool, a Cartesian tool, in the Durand’s sense that can be broken, changed, and modified.

Cassarà agrees with Rykwert on the importance of the Bronx Development Center in the sense that it ushered in the phase of metal cladding panels. The use of metal cladding manifested Meier's interest in the technical variable and perfect execution, an interest that blossomed in the Atheneum afterwards. This metal paneling that moved from the rectangular in the Bronx to the squared one in the Atheneum became more than a technical cladding system; it formed a perceptual and organizational system upon which the geometries of circumferences, squares, and straight lines were implanted.

As such, through the use of the grid manifested in regulating lines, structure manifested in structural columns and planes, the cladding panels, and their interdependencies, Meier manipulates the basic geometries and forms into compositional coherence creating object-like buildings, and accordingly Cassarà agreed with both Hurtt and Allen earlier that the value of systems Meier uses is not in the system itself; rather in the way these systems are independent and used in the overall formal language.

On the interior of his building, Cassarà acknowledged that fluidity of Meier's spaces through using parallel planes and columns marking both architectural and structural systems. These planes and columns used in the design of plans help to highlight the interior depth of the building by marking out functional zones and internal routes. Thus, here again, Cassarà confirms the themes of layering and *promenade architecturale*, therefore, despite the fact that these planes are autonomous but their overall composition gives the form its dynamism.

It is obvious from the descriptions in this section that different researcher and authors recognize that Meier's buildings retain an identifiable formal language that runs across a range of building types built in different contexts. The literature review in this section showed that the characteristics of the formal language Giovannini sketched in 1996 had its roots since the outset of his career and reoccurred in various degrees in the projects that followed across the years until maturely materializing and becoming consistent in the projects designed by Meier's New York Office.

4.5 Chapter Summary

This chapter had three aims: first to characterize the formal language of Meier between 1986 and 1996 through literature review in order to set the grounds to test the formal language and its interaction with the program requirements of the Islip Courthouse building. Second, to show how the formal language is employed in the design of a building through the formal analysis of a case study; the Barcelona Museum of Contemporary Art, and third to trace the development and consistency Richard Meier's formal language through reviewing literature about different Richard Meier projects from the beginning in the mid 1960s until the mid 1990s.

The major characteristics of Meier's formal language in projects carried out by the New York Office included: clarity of the overall organization through the employment of a spinal wall marking. The spinal wall is often crossed by a 90° degree secondary axis marked by a transverse wall marking the entrance to the building. The intersection of the walls creates a syntactic center that interacts with a functional center such as an entrance hall, an atrium, or main circulation space adding tension and dynamism to the internal space of his buildings. The programmatic functions are isolated and expressed separately in separate forms and volumes connected via the spinal wall, while entrances and public spaces are designed as rectangular, cylindrical or conical forms that are often articulated and transformed and played against the spinal wall or the main mass of the building. The main masses of the buildings are conceived as layered bars. These bars, which are geometrically linear, are straight and orthogonally organized into zones marked by walls and columns. The overall compositions of Meier are marked by the juxtaposition of circles or parts of circles against linear elements or rectangular blocks. These compositions are organized over an underlying grid and structured via regulating lines derived from different proportional systems. In that sense, in Meier's designs, there is a field organized by the geometrical grids on which figures stand out.

Section two investigated how the themes of Meier's formal language were employed in the design of the Barcelona Museum of Contemporary Art. Through formal

analysis, the thesis uncovered how the layered plan of the museum produced through a set of elements including columns, planes, glazed ramp hall, cylinder, and rectangular spaces was regulated through precise modularity and proportional systems. The analysis also uncovered how the ordering and articulation produced themes and concepts such as tension and reversal.

Through literature review, section three tracked the development of the formal language to the beginning of Meier's career and traced its consistency through different projects. The literature review affirmed the duality of Meier's work: the real and pragmatic, and the abstract and ideal. The real and pragmatic is manifested in Meier's attention to the site, program, entrance, and enclosure, while the abstract is manifested in the application of abstract notions such as layering, geometry and proportion, and formal juxtaposition organized by grids and guidelines. The literature review confirmed the findings of the morphological analysis and further established the characteristics of the formal language.

Therefore, chapter three established the programmatic requirements of the Islip Courthouse building, this chapter established the formal language of Richard Meier sets the ground for the, thus, setting the ground for the formal analysis of the Islip Courthouse building to investigate how the formal language interacted with the programmatic requirements, and to uncover what the formal language added to the program and to the design of the building and vice versa.

5 CHAPTER FIVE: THE MORPHOLOGICAL ANALYSIS OF THE ISLIP COURTHOUSE BUILDING

5.1 Introduction

This chapter reconstructs the design of the Islip Federal Courthouse building through the morphological analysis of the formal structure of the building. The reconstruction is guided by an understanding of the design charge of the Federal courthouse building as presented in chapter three and the understanding of Richard Meier's formal language as presented in chapter four. Thus, some familiar themes in the formal language of Richard Meier will provide a starting point for the analysis: the visual layering of space, literally apparent or inferred according to visual information; the modularity of the design; the respect for proportional systems; the creation of syntactic centrality to complement geometric balance. The aim is to understand how Meier's design language has interacted with the constraints of the functional program and the other aspects of the charge discussed in chapter three.

Accordingly this chapter addresses these questions: Did the multiple constraints prevent the realization of formal relationships that might otherwise be expected in a Meier building? Did the organizing themes that are characteristic of Meier's language get inflected to adjust themselves to the program? In addressing such questions, this chapter looks at design as a process that brings together two independently defined formal structures, program and design language, which interact and mutually constrain each other in order to produce built form. The additional question of what the significance of the individual work may be, the fundamental question normally addressed by architectural criticism, can be approached with greater clarity after the form of the building has been reconstructed in this way. Thus, in the final parts of the chapter the question of design formulation will be addressed more explicitly: Did Islip lead Meier to formulate significant new possibilities within his design language? Did Meier succeed in

formulating courthouse design in a way that enriches the architecture associated with the building type and thus respond to the aims of the Design Excellence Program?

The data for the analysis can be found at least in part in a booklet published by the GSA, *United States Courthouse and Federal Building: Central Islip, New York* as well as in the books on Richard Meier's work (Richard Meier volumes three and four) as well as the data on the courthouse building as provided by *Courtsweb*.³⁸ Moreover, the author also had access to AutoCAD plans provided by the GSA as part of *Courtsweb* (Dr. Craig Zimring, PI). However, plans or other drawings which have not already been published will not be reproduced here, in order to comply with the obvious requirements of confidentiality. Nevertheless, all basic measurements mentioned in the text are extracted from information and documentation available to the author at the time of the study. and the author's notes and observation.

The chapter is divided into different sections. The first section provides an introductory account and description of the building. The second presents a formal analysis. The third discusses the main conclusions from the analysis.

5.2 A first look at the Islip Courthouse building

The design of the Islip Federal Courthouse started in 1993 and was completed in 1995. The construction contract was awarded in 1996, and the building was completed in 2000. The building is situated on an isolated 29-acre site near the Southern State Parkway, adjacent to the New York State County Courthouse. The main body of the courthouse is a rectangular block approximately 550 ft. in length, and 227 ft. in height (from the entrance level to the highest point in the building) consisting of 11 stories³⁹ and

³⁸ 'Courtsweb' is a funded research project carried at Georgia Institute of Technology under Prof. Craig Zimring (PI) that aims at creating a database that includes more than 42 federal courthouses by now that have been built under the GSA design excellence program. The Courtsweb includes all available information on 42 courthouses, thus, providing opportunity for analysis and further research with information available at hand.

³⁹ Due to the double height of the courtrooms, the actual height of the building would be around 22 floors in an area where the average height of the buildings is around three floors.

a basement with an entrance rotunda of 9 floors in height. The total area of the courthouse building is 735,000 sq. ft.⁴⁰. The courthouse building houses 24 courtrooms: one Special Proceeding Courtroom, 14 District, four Magistrate, and five Bankruptcy Courtrooms. The courthouse also houses 23 judge's chambers, a central law library, office space for several federal agencies; the Clerk of the Court, U.S. marshals, U.S. Probation, U.S. Trustee, tenant office space, and a cafeteria. There is covered secured parking for 361 cars and surface parking for 419 cars. The building is designed for future expansion where it can house up to 39 courtrooms and 42 judge's chambers.

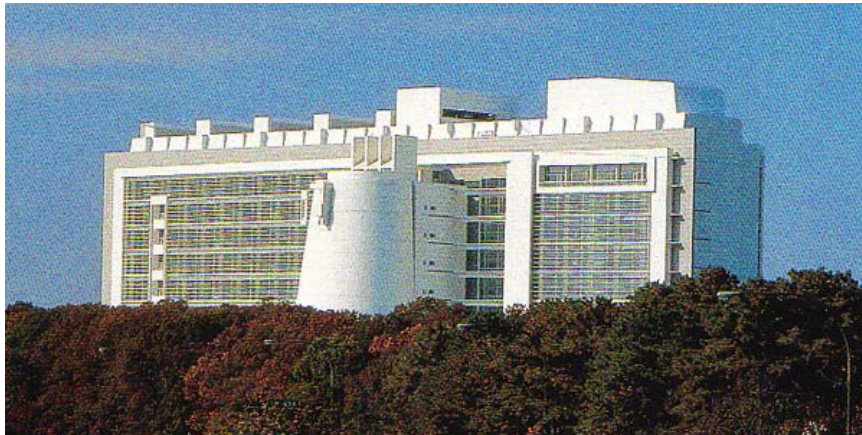


Figure 5-1 Islip Courthouse Building, NY. (Source: Frampton, 2002)

The building is designed as a free standing monument elevated on a broad concrete plaza that leads to an entry rotunda on the south façade (Figure 5-2). The entry sequence to the courthouse starts from the public car parking located to the west of the plaza and continues with the paved plaza (Figure 5-3). The plaza is reached by two flights of stairs that run parallel to the building leading directly to the entrance. The plaza is minimally delineated by geometric configurations of low walls, ramps, and trees. A slightly bowed ramp cutting across the plaza contrasts the lightly bowed glass wall on the

⁴⁰ According to courtsweb.coa.gatech.edu the gross area of the courthouse is 870,000 sq. ft., including parking while the net area including parking is 465,000 sq. ft. The efficiency factor of the courthouse building is 63%. Efficiency is calculated by dividing internal functional areas in all floors, excluding circulation areas, vertical penetrations and areas of internal walls and partitions over the overall area of the building.

south façade (Figure 5-4). The entrance rotunda is a massive free-standing truncated conical form clad with aluminum coated white panels and carefully articulated with intersecting elements that form a balcony on the top (figure 5-5a). A canopy cuts through the shell of the rotunda near its base of the rotunda and projects to shelter the principle entrance to the courthouse (Figure 5-5).

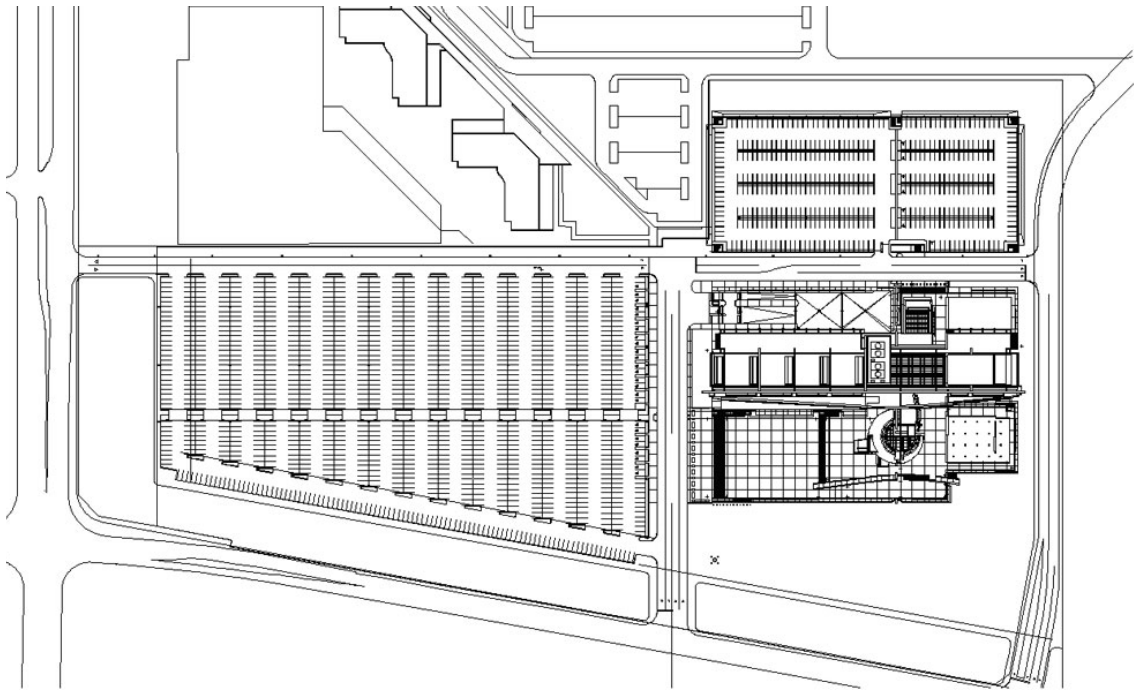


Figure 5-2 detailed site Plan of the Islip courthouse building (Source: *Courtsweb*, 2004)

Inside of the rotunda, the entry hall is illuminated from the top by a girded skylight and glass curtain walls on the sides. Light is further intensified by the curved walls of the rotunda that reflect and project light through the oculus at the top (Figure 5-6). A visitor control point is located to the left of the entrance hall ahead of the glazed corridor with a slightly curved side linking the entrance rotunda to main block of the courthouse building. The corridor ends with the large central atrium that levitates 11 stories to the full height of the building (Figure 5-7).



Figure 5-3 the Islip courthouse building as approached from the public car parking area. (Source: Courtsweb, 2004)

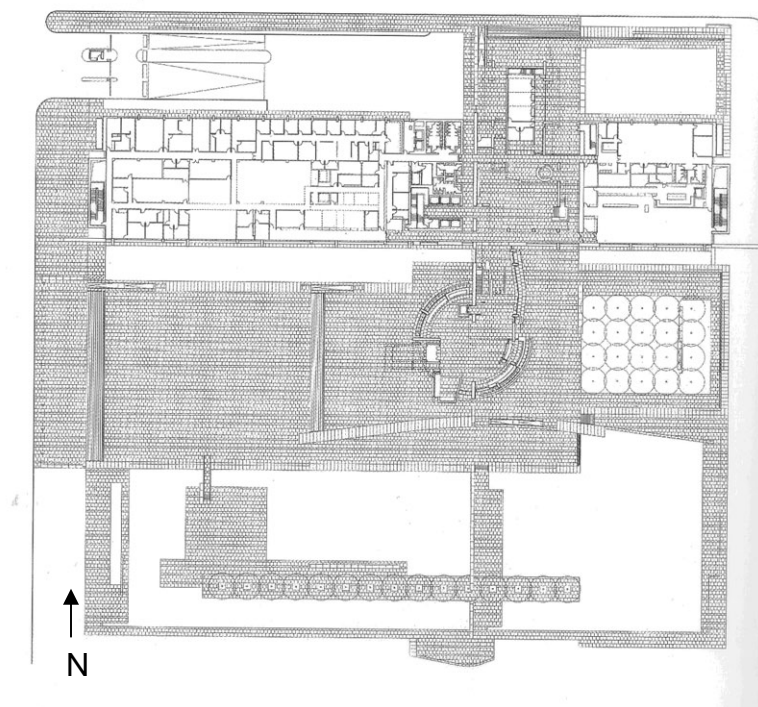


Figure 5-4 Islip entry floor plan showing approach and site landscaping (Source: Frampton, 2002)



Figure 5-5 the picture on the left shows the entrance rotunda in front of the main body of the courthouse (Source: *Courtsweb*, 2004), while the picture on the right shows the main entrance to the building with the projecting canopy. (Source: Frampton, 2002)



Figure 5-6 skylight over the entrance rotunda. (Source: *Courtsweb*, 2004)



Figure 5-7 the main atrium showing private circulation bridges on the 9th floor. (Source: *Architecture*, 2001)

The atrium is the main public space in the building. The northern side of the atrium has an expansive glazed elevation. The bridges that cross the atrium run parallel to it. On the eastern side of the atrium is located the main assembly room for the jury, along with its service spaces, while the west side leads to public restrooms, stairs and elevators. According to the booklet on the courthouse building issued by the GSA (2000) the atrium is a “*ceremonial place*” where people can assemble on the ground floor and the “*expansive second floor balcony*” that also serves as an entrance to the Special Proceeding Courtroom. The second floor balcony is reached by an open staircase in the atrium. Directly adjacent to the northern side of the atrium, along the north façade behind the glazed panels, projects the mass of the Special Proceeding Courtroom. The Special Proceeding Courtroom is designed as a free standing volume to “*signify the important events that take place in it*”.⁴¹

The first three floors of the building house the ‘high volume’ functions, such as the office of the court clerk and the US Probations office, while the different courtrooms are located on the upper floors. On courtroom floors, district and Magistrate courtrooms lie to the west of the atrium while Bankruptcy courtrooms lie to the east. The public zone

⁴¹Source the Islip courthouse booklet *United States Courthouse and Federal Building: Central Islip, New York*

takes the form of a linear lobby or wide corridor that runs behind the façade (hatched in red, Figure 5-8), offering a panoramic view of the Atlantic and gradually narrowing as it reaches towards the two ends of the building.

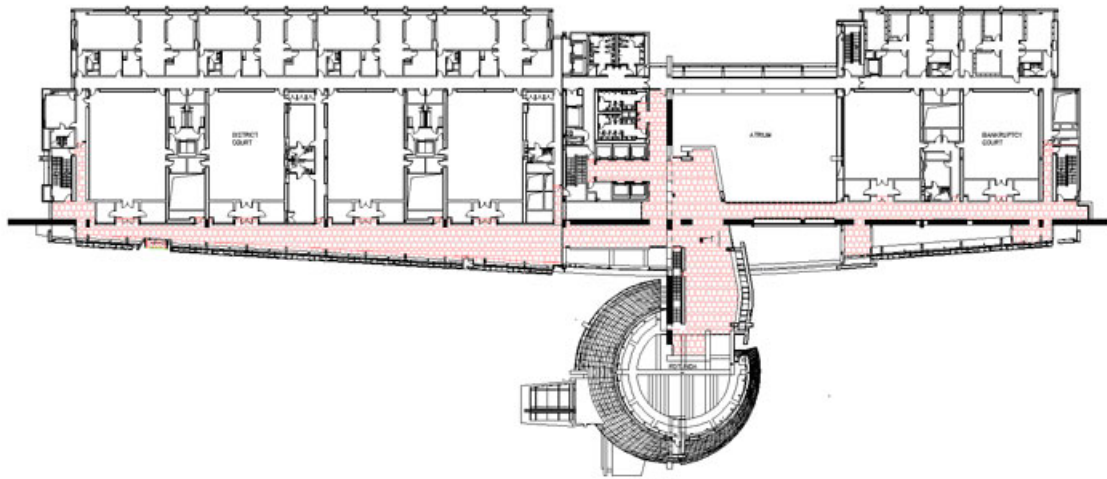


Figure 5-8 a typical courtroom floor in Islip: the courtroom zone is sandwiched between the judges' chambers on the northern Façade and the public zone on the southern façade. (Source: redrawn by author from *Courtsweb*, 2004)

The contours of aluminum mullions frame the light into shifting patterns reflected on both the floor of the public corridors and the granite wall along their inner edge (Figure 5-9). All courtrooms are located behind this granite wall. The wall defines a plane that cuts longitudinally through the whole building and complements the rotunda as one of the building's trade-marks. From the outside, it acts as a backdrop to the glazed brise-soleil and the entry rotunda (Figure 5-10). On the inside it frames the entrance vestibules to the courtrooms symbolizing the transition between the public zone and the interface or courtroom zone.

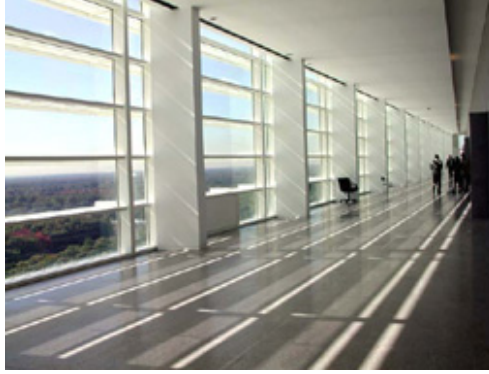


Figure 5-9 public corridors overlooking the Atlantic with shadow patterned on the floor. (Source: *Architecture*, 2001)

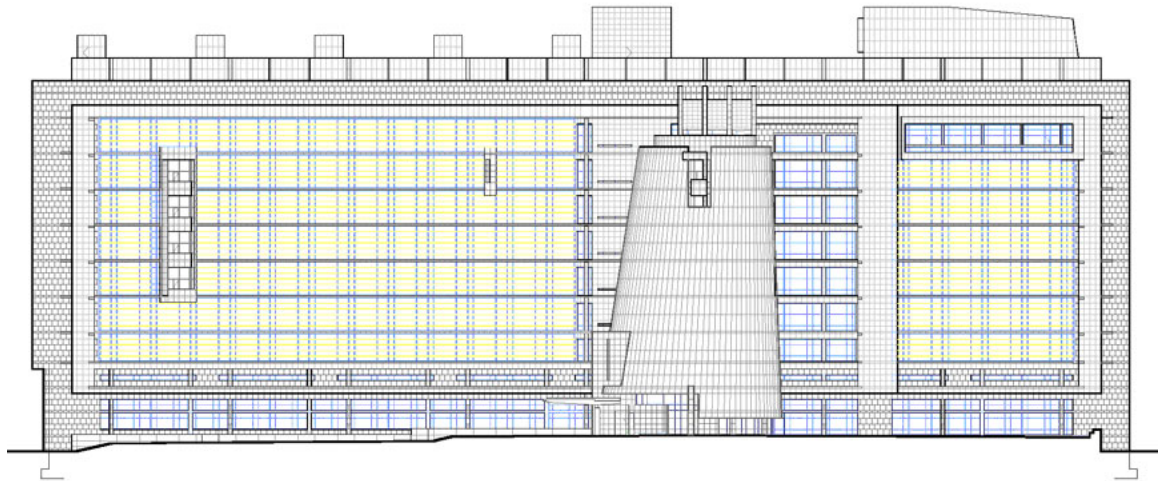


Figure 5-10 the Southern façade with the entrance rotunda and the expansive slightly bowed brise-soleil played against the towering granite wall. (Source: redrawn by author from *Courtsweb*, 2004)

The judges' chambers are arranged along the northern side of the building. Accordingly, the north façade of the courthouse is broken into three parts: the middle glazed part corresponds to the atrium. The two lateral parts are rendered as white planes and clad with Meier's signature enamel panels;⁴² they are broken by horizontal strips of

⁴² The exterior of the building is clad with 3 ft.x3 ft. white coated aluminum panels as well as grey panels on the west and east elevations. The longitudinal wall cutting through the building forming the entrances to the courtrooms is of granite, and the same material i.e. granite, is used for the floors of the public spaces.

windows giving light to the judges' offices behind them (Figure 5-11). Adjacent to the atrium-glazed panels, lies a white enamel block with the private rest rooms behind it.

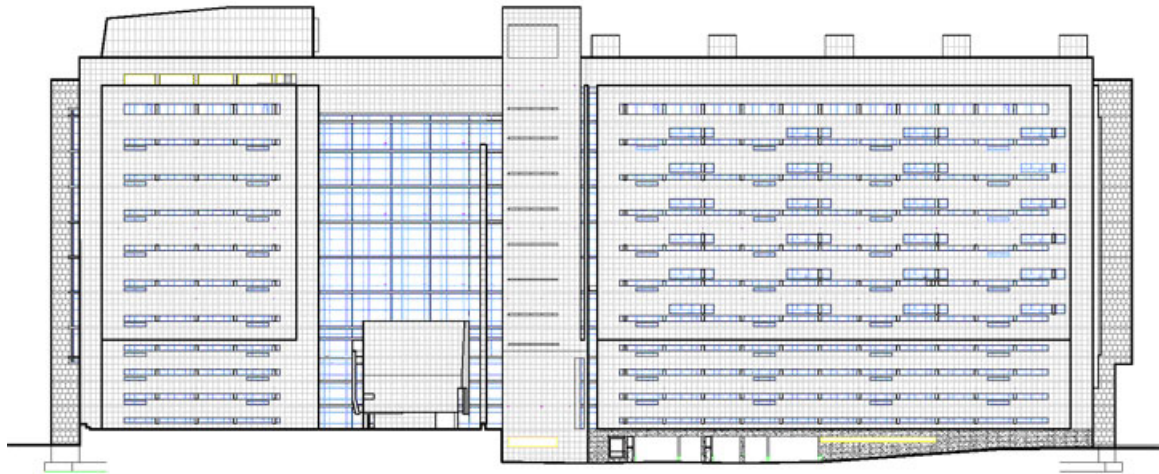


Figure 5-11 North facade with the three-part massing and the Special Proceeding courtroom projected from the main building. (Source: redrawn by author from *Courtsweb*, 2004)

The side elevations are treated differently, so that they may express the layering that is implicit in the frontal treatment of the two main facades. The west elevation is visible as one approach the building from the open parking lot and it reveals a series of planes that are arrayed behind the entrance rotunda: the rotunda is placed in-front of the bowed brise-soleil; the frame holding the brise-soleil is separated from the granite wall by thin vertical glass windows. The granite wall is separated from the main body of the building by a slit of vertical glass with balconies projecting in front. The final zone, corresponding to the judges' chambers, is articulated by vertical glass panels that mark the end of the judges' private corridor. Seen from the west, the northern outer wall gives the impression of a separate plane separated from the main body of the building by a vertical row of windows (Figure 5-12).

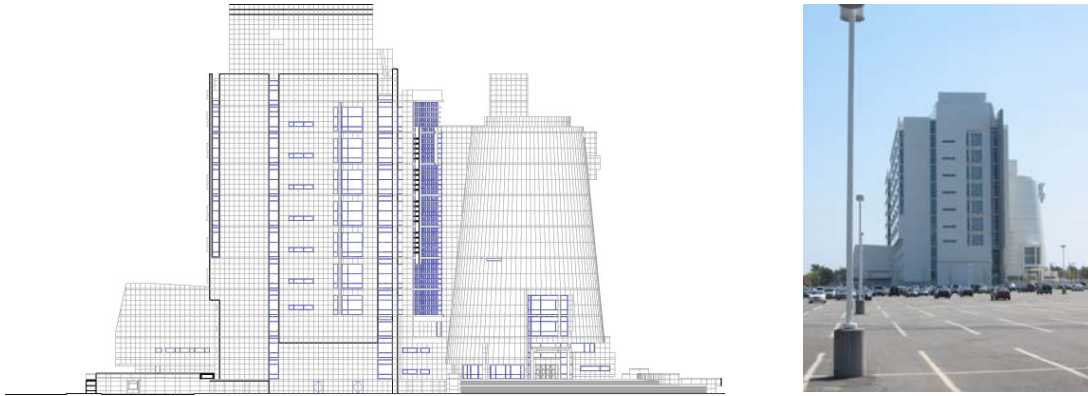


Figure 5-12 the segmented scheme of the west elevation as seen from the public parking (Source: *Courtsweb*, 2004)

The aim of this section was to familiarize the reader with the Islip Courthouse building through verbal descriptions and visual representations. Among the striking features described: the treatment of the building as a free-standing linear block overlooking a vast entrance plaza; the juxtaposition of the conical entrance rotunda as a dominant figure against the linear block of the building; the granite wall that runs across the whole length of the building; and the dual treatment of the two main elevations as well as the treatment of the side elevations. The next section will address in depth the functional and formal characteristics of Islip.

5.3 Visual and Formal Analysis of the Islip Courthouse Building

This section will discuss the formal structure of the Islip courthouse building. The discussion will first deal with the overall form of the building picking up design tactics and themes that are characteristic of Meier's formal design language that were identified in chapter four. The first examination of the building reveals some rather strong architectural organizing principles that include layering and the creation of a syntactical center, but before discussing these formal principles, it is of importance to discuss the functional organization inside the courthouse due to its impact on the formal structure of the building. The building has two secondary principles of zoning. The first is functional

zoning that is deployed both vertically and laterally. Vertically, the 'high volume' functions are placed in the lower floors with the courtroom floors above them, the functional distinction is also rendered as a distinction between building base and the main building volume. The vertical separation is shown in Figure 5-13.

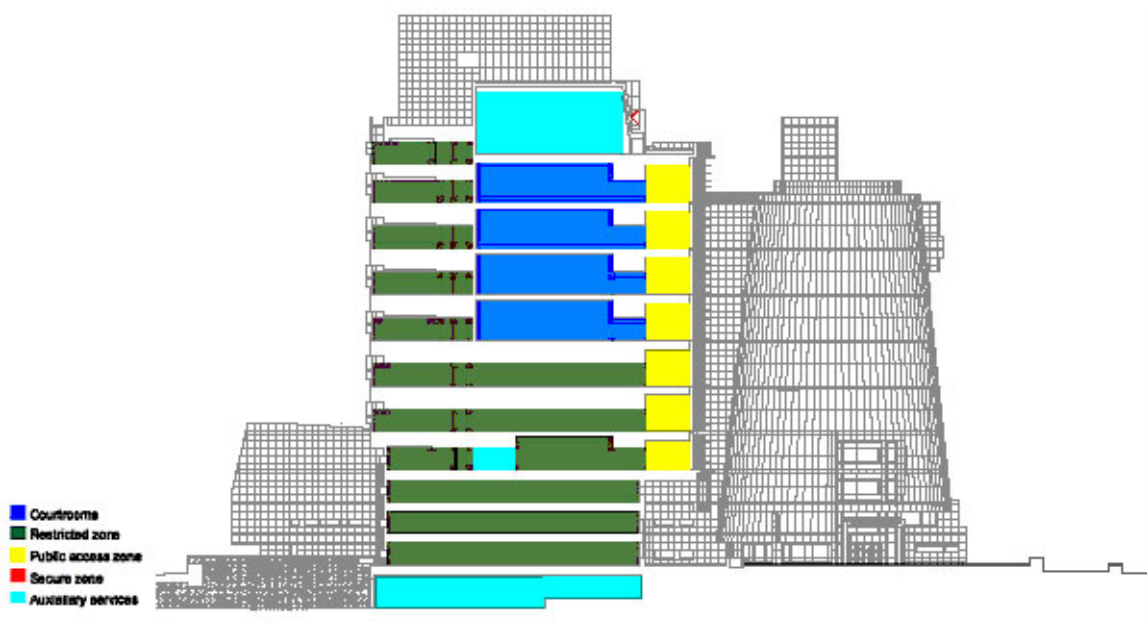


Figure 5-13 the vertical functional organization showing separation of 'high-volume' functions and 'low-volume' functions (Source: *Courtsweb*, 2004)

Laterally, the private zone with the judges' chambers and supporting functions is arranged at the back and corresponds to the less open mass of the building. The interface zone, including the courtrooms, is located in the middle. This middle zone also houses the secure zone. The public zone is arranged along the front. The interface zone is reached from restricted and public horizontal circulation as well as from vertical secure circulation cores (Figure 5-14). In these respects, Islip conforms to the dominant linear organizational model presented in chapter three. Nevertheless, the atrium divides the bankruptcy courtrooms on the east from the District and Magistrate courtrooms on the west. In this way, the separation of the building into two distinct wings not only

expresses a functional distinction between the courtrooms along the two sides of the atrium, but also serves Meier in creating a syntactical center as will be shown later.

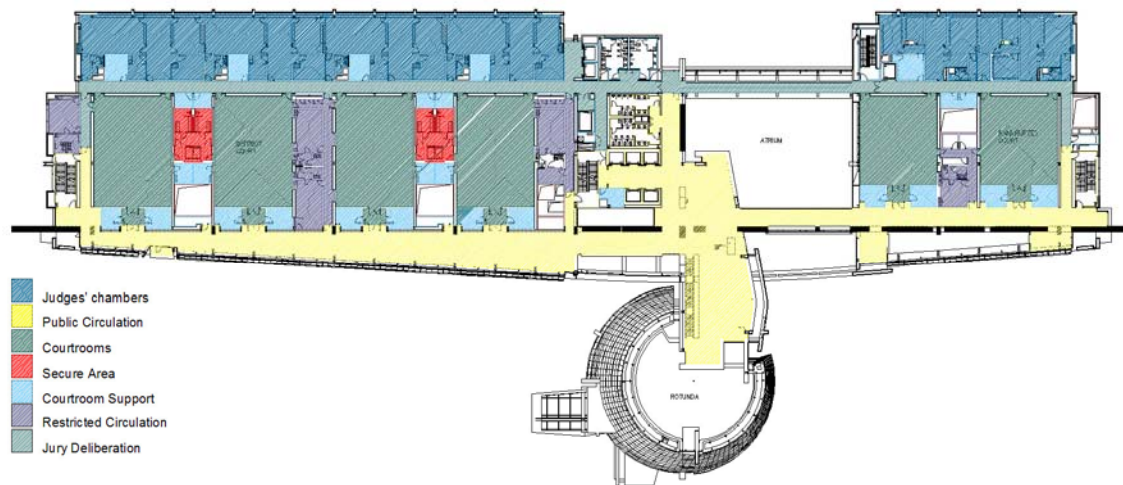


Figure 5-14 the horizontal functional organization in typical courtroom floors at Islip (Source: Author)

The introduction of a main atrium space that extends to the full height of the building, which is a feature that is only found in the concentric functional configuration identified in chapter three represents Meier's main difference from other linear buildings studied in chapter three. The atrium breaks the continuity of the functional zones and the location of the vertical circulation and invites the public to go inside the granite wall overlooking the atrium and providing views of the judges' private circulation bridges in front of the expansive glazed façade of the atrium.

What Meier's design adds to this functional organizational model is the conjunction of visual layering, and functional zoning. In other words, Meier adds the interpretation of the functional zoning in terms of visual layers. As can be seen in figure 5-12, Meier broke the west elevation into a series of segments or masses that are juxtaposed consecutively. Following the functional organization of the plan mentioned earlier, one can notice that these segments correspond to the functional zones of the

layout where each segment represents a functional zone within the plan of the courthouse building (Figure 5-15). Thus, the public part corresponds to a transparent illuminated zone which is separated from the interface zone by the granite wall which traverses the whole length of the building acting as a major datum of visual reference. In this manner, a clear architectural contrast is created between the public and private zones to correspond to an equally clear contrast between the more open front and the more opaque back of the building.

In addition to functional zoning, another principle used to organize the building is the creation of a syntactic center, represented by the atrium and the rotunda. At ground level, the atrium separates two wings of private office space while also leading towards the special proceedings courtroom. Service functions such as restrooms, and vertical circulation cores for the public are adjacent to the atrium.

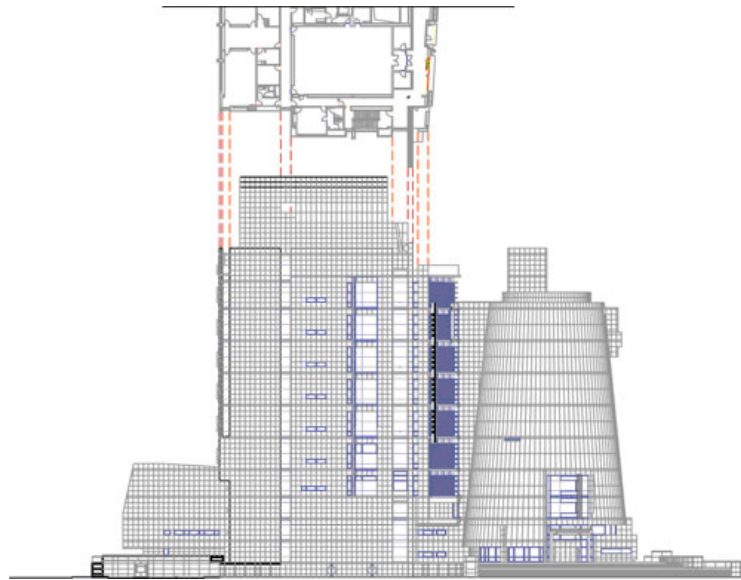


Figure 5-15 layering of the west façade expressing the functional zones in the plan of the Islip Courthouse building (Source: Author)



Figure 5-16 the layering of the west façade from the car parking (left). A closer look at the façade treatment showing the glass recesses in-between masses (middle). The east façade with layering as a design theme (right) (Source: *Courtsweb*, 2004)

At higher floors, the atrium separates the two kinds of courtrooms. From an architectural point of view, however, the atrium is also used as a fulcrum point. The two public circulation corridors are slightly offset from each other, as a consequence of the difference in areas between the District and Magistrate courtrooms, so that they reach into the atrium but do not extend past it. This forces the public movement to shift exposing both a gathering area penetrating the space of the atrium at an edge, and a gathering area that overlooks the rotunda thus extenuating movement experience. Thus, from the point of view of public circulation and public space, therefore, the atrium functions as a central point of convergence. By contrast, the private corridors run through the atrium. This results in the higher integration of the private back corridor as compared to the public front corridor, a characteristic which Islip shares with other buildings adopting the linear growth model, as shown in chapter three.

From a compositional point of view, the effect of the syntactic center is further reinforced through the intersection of the two walls perpendicular to one another, the spinal wall and the transverse wall, at the point where the public circulation corridor offsets. Furthermore, Meier does not place the main atrium of the building at the point of

intersection; rather, he shifts the main atrium upwards in an angle so that the intersecting walls form its two lower edges. Figure 5-17 elaborates on the points mentioned above.

The conjunction of the visual layering with functional zoning and the conjunction between syntactic centrality and the intersection of the two walls affirm the conclusion that the overall form serves to articulate and express the functional program in architectural terms. This will probe further investigation of the formal composition of the Islip.

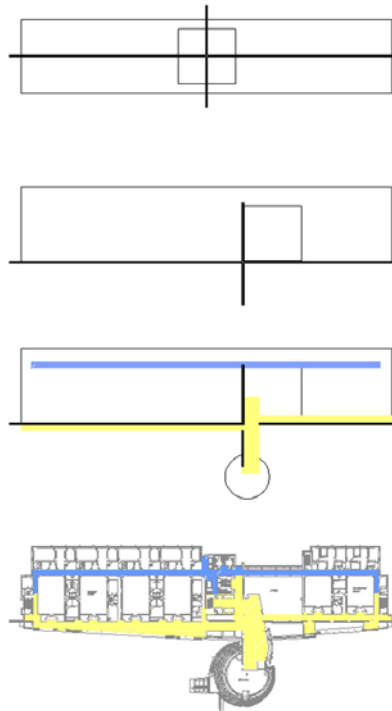


Figure 5-17 the creation of a syntactical center through formal means" the atrium and the intersection of the two walls (Source: Author)

5.3.1 Islip: Formal Composition

One of the most compelling characteristics of the Islip courthouse design is the juxtaposition of geometric forms together. The overall form of the building is characterized by three main geometric forms: the main body of the courthouse is a linear rectangular block juxtaposed with the conical entrance rotunda on the south façade and the rectangular cubic block of the Special Proceeding courtroom on the north side (Figure 5-18). Each of these masses have a distinctive function: the conical entrance rotunda houses the main public entrance to the building; the main building block houses the main functions of the courthouse; and the Special Proceeding courtroom is treated as a separate mass due to the symbolic nature of the functions that take place inside it. Besides the obvious distinction in form, Meier distinguishes the exterior of the three masses through the use of varied white aluminum cladding panels: the main courthouse building along with the Special proceeding courtroom panels are square (3ft.x3ft.), while the rotunda panels are rectangular clad vertically aligned. Thus, within the design of the courthouse building, as with the case of the Barcelona Museum of Contemporary Art, Meier continues to practice one of the trademarks of his formal language; the juxtaposition of forms together, especially, the play of the circle against a linear rectangular block.

Meier further articulates the main body of the building by means of subtraction and addition: Meier breaks the main block of the courthouse building into three parts by subtracting a block where the atrium space is located, thus, enabling a functional reading of the elevation. Meier further adds several masses on top of the building giving it a industrial and contemporary appearance, and adds the two fire escape stairs on the sides of the main building block. Figure 5-19 shows a diagrammatic representation of the formal juxtaposition of the Islip courthouse building.

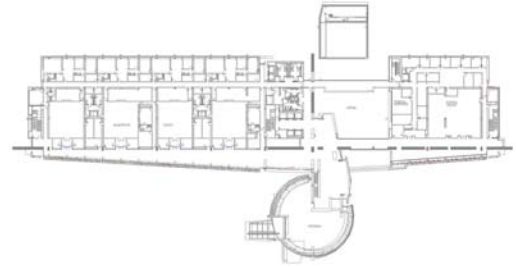


Figure 5-18 the model of the Islip courthouse building showing the juxtaposition of the entrance rotunda against the main body of the building and site plan showing the mass of the Special Proceeding Courtroom on the south façade. (Source: Meier, 1999)

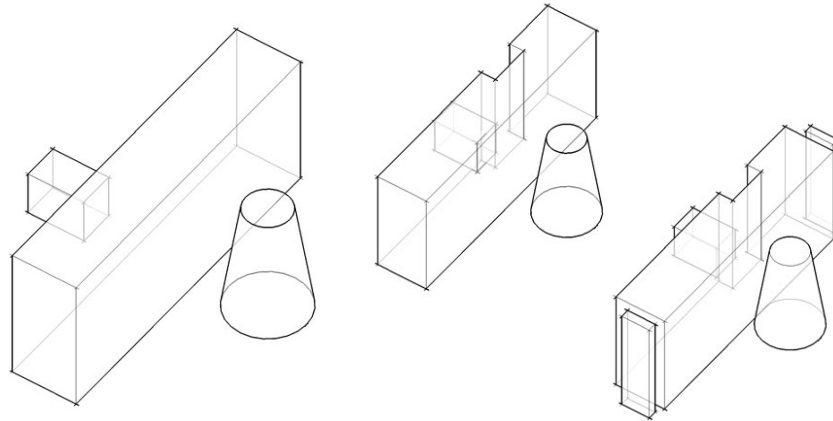


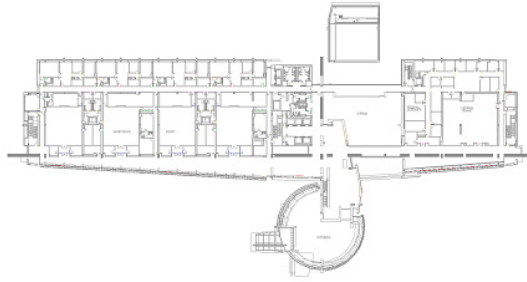
Figure 5-19 a reconstruction of the formal composition of the Islip courthouse building (Source: Author)

5.3.2 The wall as a design theme

The linearity of the main building block is further accentuated by the introduction of the main spinal wall that cuts through the building from east to west peaking above adjacent parapets and projecting from both ends of the building.⁴³ The granite plane further frames the building's glazed façade and is seen through it via the openings and frames Meier created (Figure 5-20). This spinal granite wall is intersected by a transverse wall at the lower south-west vertex of the atrium. This transverse wall, which peaks on top of the main building block, connects the entrance rotunda with the main body of the building running by the edge of the atrium and connecting to the Special Proceeding courtroom in the back of the building (Figure 5-21).

In the overall form of the building, the granite spinal wall plays many roles on different levels; on an abstract level, it augments the metaphor of the whole building being a wall that defines the public plaza block; visually, it acts as a frame for the planes that hold the expansive glass panels and the horizontal sun screens; on a compositional level, it acts as a datum line that holds the whole layout together; functionally, it marks the entrances to the courtrooms, thus separating the public zone from the interface zone, and furthermore, it defines and organizes the public circulation corridor along the whole length of the building while the transverse wall defines public circulation across the building.

⁴³The author defines the process of breaking up of a generic form/mass into a series of layers through the introduction of horizontal planes or vertical planes as sectioning. This definition is derived from the process of producing architectural sections.



Spinal wall as seen from the back elevation



spinal wall as seen from the edge of the building

Figure 5-20 the spinal wall as seen from different angles of the building. The effect of the transverse wall is most clearly visible in the plan defining the edge of the atrium and connecting the entrance rotunda to the building (Source: Author)

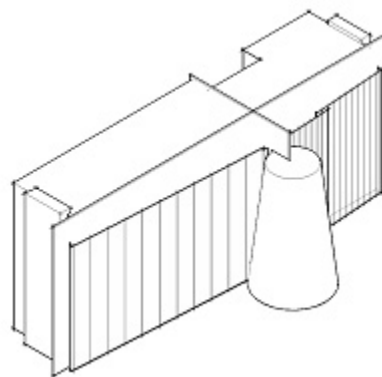
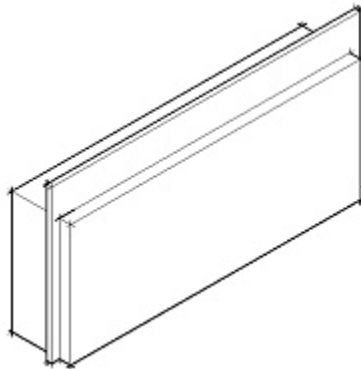


Figure 5-21 a diagrammatic representation of the two walls sectioning through the building where the spinal wall frames the glazed plane and the transverse wall connects the entrance rotunda (Source: Author)

5.4 The plan: the linear growth model invested with order, dimensional discipline and proportion.

In chapter 3, it was shown that Islip conforms to the linear growth model of courthouse design. Figure 5-22 represents the functional diagram that underlies the plan of Islip, taking an elementary linear diagram as the point of departure and reconstructing the basic transformations that are needed in order to produce the plan. In the first row of the diagram, the three zones are arranged along a rectangular shape, restricted circulation running horizontally between the private and the interface zones. Then vertical cores are inserted so as to bring secure circulation to the middle of the interface zone (second row). Subsequently, the rectangle is split to create a public reception transverse zone and to separate the district and magistrate courts wing on the longer side of the block and the bankruptcy courts wing on the shorter (third row). The two wings are further pulled apart to make space for the atrium (fifth row) which is configured as a space in its own right (sixth row). Finally, the courtroom sets are placed in the two wings. In the district and magistrate courts wing, the four court sets are paired so that each pair is serviced by a secure vertical circulation core. The question to be addressed next is how this rather abstract diagram of relationships is realized in a particular geometry. By tackling this question we will get the first insights into the deployment of Meier's language in a manner that allows the design to incorporate the exigencies of program.

Meier's designs are characterized by strong modularity and geometrical order. Islip too conforms to the strong modularity and order of Meier; by looking at the sixth row of Figure, we can surmise that the formal structure of the floor plans of Islip shows regularity and order; the plan of the courtroom floor appears to have a system of coordinates on which it has been laid out, thus it can be assumed that underlying the design of the courtroom floor, there is a module/s that structures the layout of the functions and functional zones within repetitive courtroom floors (Figure 5-23).

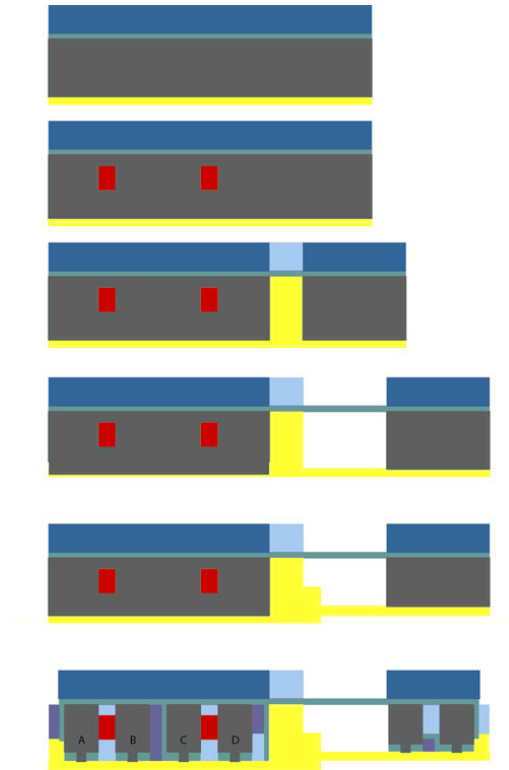


Figure 5-22 a reconstruction of the functional arrangement in the Islip courtroom floor starting from the generic linear functional configuration and ending with the particular courtroom floors (Source: Author)

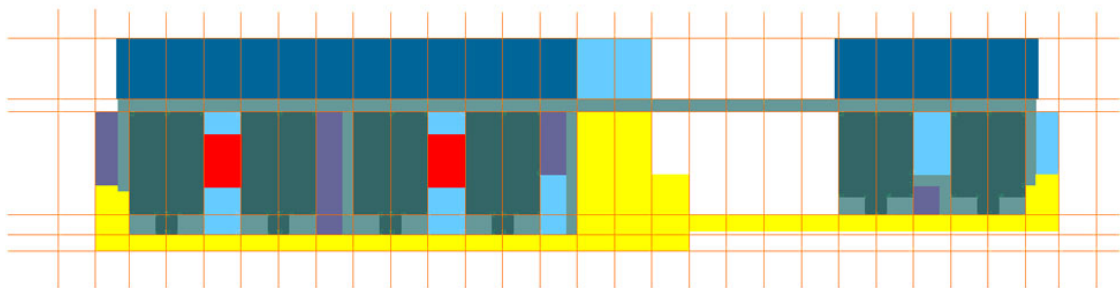


Figure 5-23 the modular system that appears to underlie the functional distribution of the Islip courtroom floor (Source: Author)

In the case of Islip, this is immediately reflected in the adoption of an underlying repetitive module of 21 feet running along the length of the building, such that the zones of support spaces between courtrooms fit into one module, while the courtrooms themselves fit in two. This is shown in Figure 5-24. As will be shown next, the underlying module corresponds imperfectly to the x-axis intervals of the structural grid. There are some key deviations from it. However, its presence documents the imposition of a geometrical order which is able to absorb space and organize the requirements of the functional diagram along the long axis of the building. As will be seen below, this order provides a foundation for more varied dimensional intervals along the transverse dimension, or the y-axis of the structural grid.

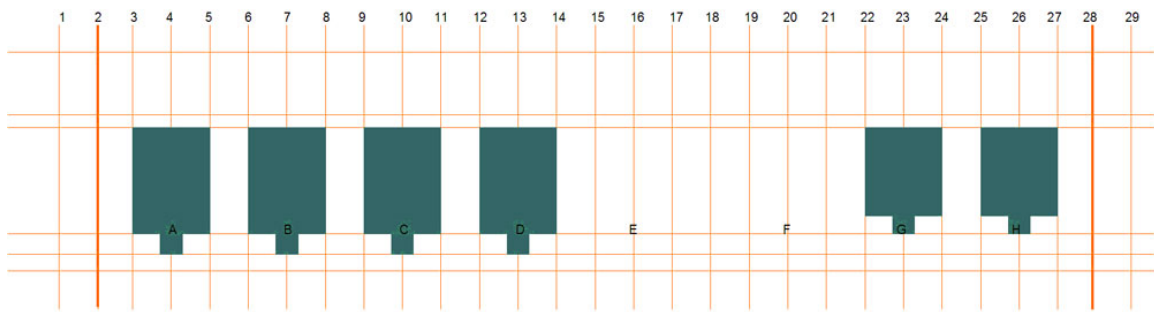


Figure 5-24 the 21 ft. module of the courtroom floor plan in Islip. The thicker module lines at 2 and 28 mark the end of the main building block (Source: Author)

The basic module of 21 feet works in conjunction with smaller and larger scales of modularity. At a smaller scale the modular interval is itself a multiple of the 3 feet panels that are used for the external panels that clad the building, conveying visually the sense of dimensional coordination which is so pervasive in all Meier's work. At a higher scale, three basic modules make up a larger unit, comprising a courtroom and a service zone. Thus, the entire building can be seen as a juxtaposition eight such larger units, such that from left to right four correspond to the district courts, two to the public zone and the atrium and two to the bankruptcy courts. Figure 5-25 shows how the basic module fits within the smaller and larger scales of modularity.

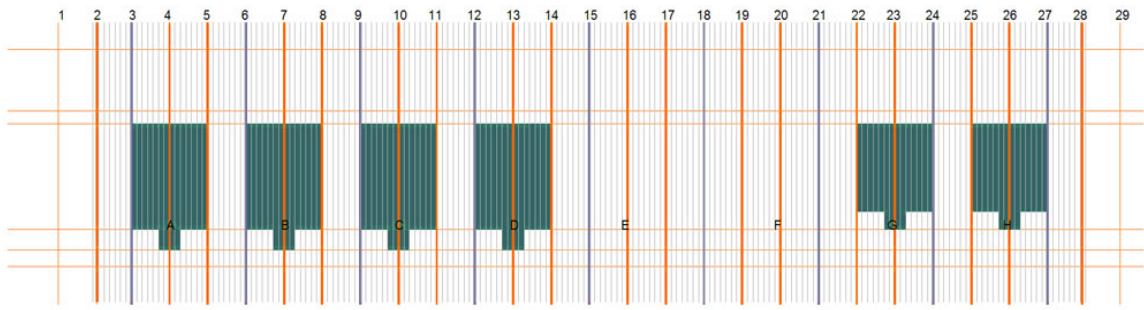


Figure 5-25 the 3 ft. module shown in grey underlies the design of Islip along the x-axis. The orange line represents the main 21 ft. structural module and the blue line represents mega module of 63 ft. (Source: Author)

Another interesting aspect of understanding the modularity of the layout is that the plan can be read as eight modules with three main intervals within each module. The center line 15 is the central axis that divides the plan into two halves and actually can be read as a mirror line around which any of the halves can be reflected. In the left half, between center line 3 and 15, Meier placed two pairs of courtrooms with their support functions; in the right half, between center lines 21 and 27 Meier placed a pair of courtrooms and between center lines 15 and 21 Meier placed services and the atrium space thus dividing the right half into two equal segments, one with courtrooms and the other is without as can be seen in Figure 5-26.

We are now in a position to discuss how modularity is realized in the alignment of the x-axis intervals of the structural grid. Figure 5-27 shows the grid of centerlines of all columns. By and large, the x-axis intervals correspond to the intervals shown in diagrams 35 and 36; as mentioned earlier; however, there are some exceptions. These concern columns between lines 2 and 3 as well as between 28 and 29. Furthermore, columns are offset between lines 14 and 20. Lines 2 and 28 correspond to the lateral edges of the building. The displacements of columns occur on offset lines 2.1 and 2.6 at one end and lines 14.6, 15.5, 17.1, 18.2, 19.1, 27.4, across the center of the building and 29 at the other end as can be seen from the figure below. The offset of offset lines 2.6, 17.1, and 27.4 can be explained in terms of the exigencies of expressing modularity in the external

elevation of the building. The offset of the structural grid allows external cladding to be completed without breaking any of the 3x3 feet tiles.

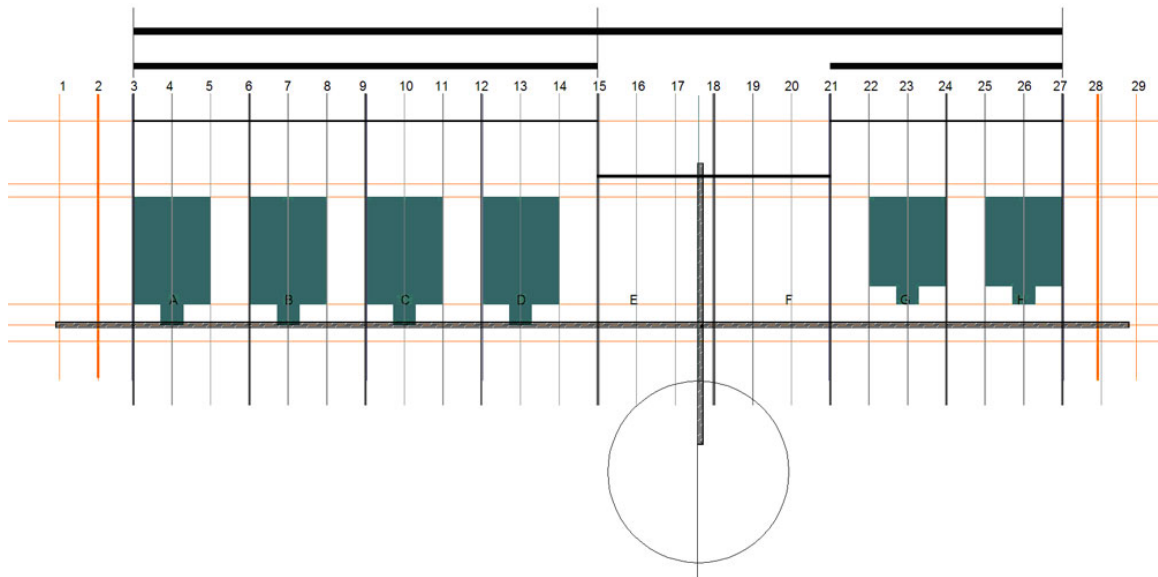


Figure 5-26 the division of Islip into two equal segments with the transverse wall offset from the centerline 18 (Source: Author)

The violation of the underlying module between lines 14 and 20 has to do with less technical constraints. The atrium and public zone occupy the fifth and six composite units of 63 feet. Thus, they constitute the inner quarter of the right hand half of the building. One would, therefore, expect that the transverse wall conjoining the main body of the building to the rotunda be placed in the middle of the composite interval; that is on line 18. This is not the case. In fact, the wall is offset by 3 feet to the left. Analysis shows that the offset is driven by a proportional system which governs the dimensioning of the building as a whole and the placement of the rotunda and transverse wall more particularly. To appreciate this we have to look at the y-axis of the structural grids which has not been properly considered so far.

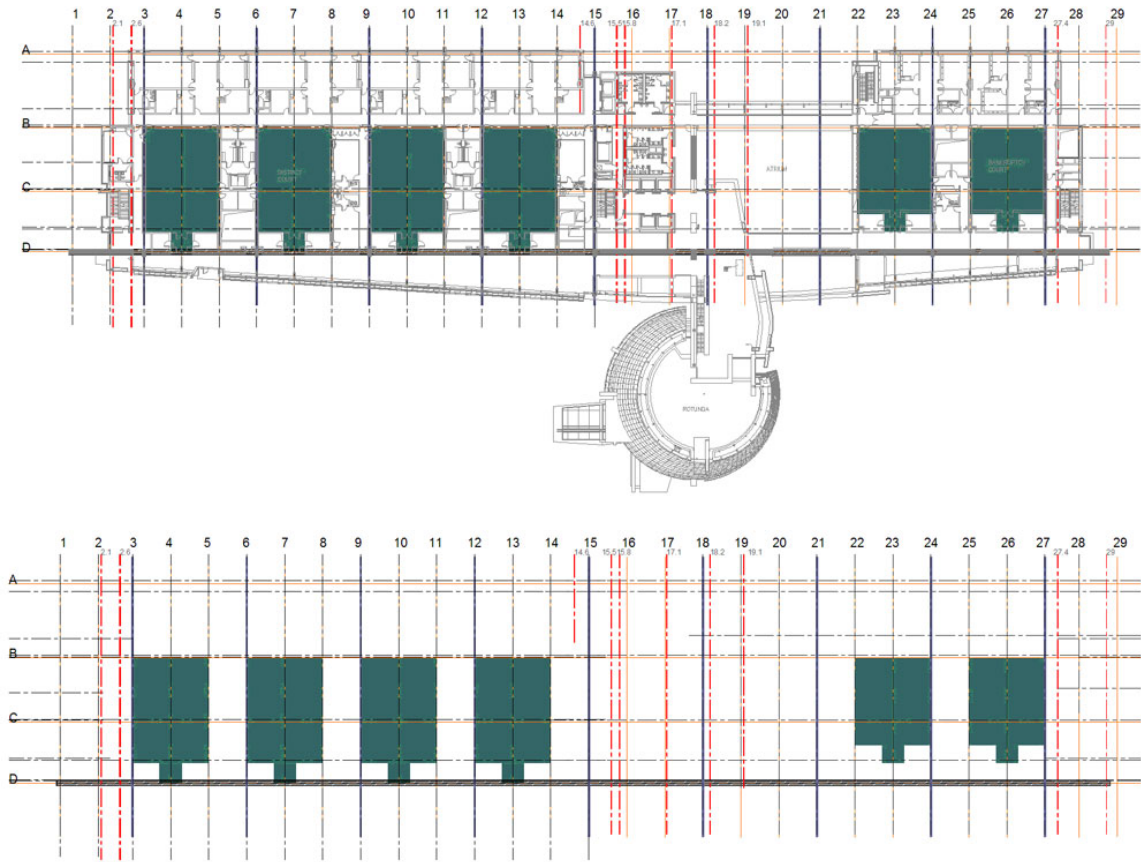


Figure 5-27 the discrepancy between the underlying module and the structural grid: the structural lines in the red dotted line do not comply with the underlying module Meier used (Source: Author)

The y-axis intervals are conspicuously unlike the intervals on the x-axis because they do not conform to any apparent module. As shown in Figure 5-28, there are 4 major structural lines that continue along the whole length of the building. **A** passes through the back wall of the judges' chambers; **B** passes through the back wall of the courtroom; **C** passes through almost the middle of the courtroom; and **D** is located at the center of the major spinal wall. The distance between **A** and **B** is 41 ft. The distance between **B** and **C** is 35.5 ft, and the distance between **C** and **D** is 33.75 ft.

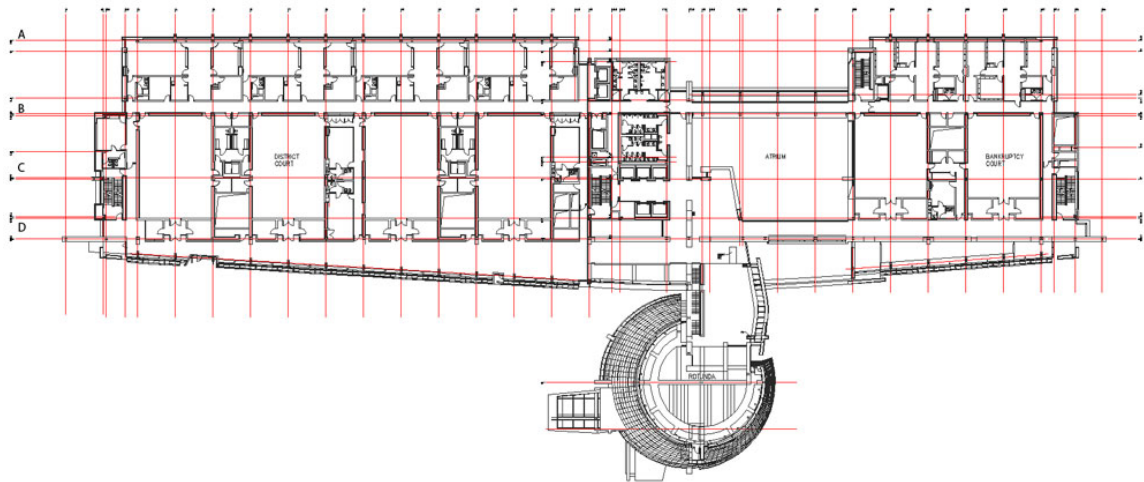


Figure 5-28 the main structural lines (A, B, C, D) along the y-axis in Islip (Source: *Courtsweb*, 2004)

At first hand, these numbers seem unrelated and not even a derivative of the 3 ft. tile module Meier uses along the x-axis and more importantly, they do not justify the location of the spinal wall, which is the most important and prominent design element. Thus, the assumption that there is an underlying regular module that regulates the structural centerlines along the y-axis can be disregarded; but knowing Meier's use of geometry and proportion in most of his buildings, if not all, supports the assumption that Meier may have used a proportional system to create a module that regulates the centerlines along the y-axis. In order to uncover such a proportional system, the plan of the 8th floor is abstracted so that only the major structural center lines are kept and everything else is removed (Figure 5-29).

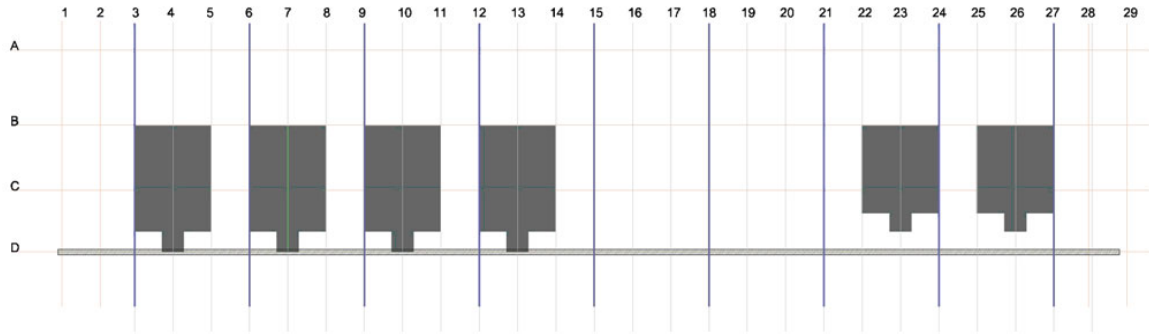


Figure 5-29 the major centerlines along the y-axis (Source: Author)

A closer look at Figure 5-30 suggests that the area between centerline **A** and centerline **B** and any two intervals along the x-axis such as centerlines 3 and 5 is an almost perfect square; the distance between **A** and **B** is 41 ft. and the distance between two intervals along the x-axis is 42 ft. which is 98% of a perfect square. Then one can hypothesize that Meier used an almost perfect square of 42 ft. in dimension to locate centerline **B** but shifted the centerline B by 1 ft. for practical or technical reasons (Figure 5-30a). Such a square may indicate the use of an underlying proportional system; if one assumes that Meier did not shift centerline **B** by 1 ft. and maintains a hypothetical square of 42 ft., the resulting rectangle between the lower edge of the Hypothetical Square and centerline **D** seems to have the proportions of a golden section (Figure 5-30b). To test this hypothesis, another hypothetical square of 42 ft. is drawn along the edge of the first square, from the mid point of the edge along the y-axis; a circle is drawn passing by the lower right corner of the square. The circle passes through centerline **D** (Figure 5-30c). This confirms that Meier did not arbitrarily locate the spinal wall across the building but used the proportion of the golden section to do so.

Thus, the allocation of centerlines **A**, **B**, and **D** have been justified: **A** is located at the rear edge of the building; centerline **B** is 41 ft. away from centerline **A** which is almost equal to the 42 ft. horizontal distance between the centerlines forming an almost perfect square; centerline **D**, marking the spinal wall, is located via the golden section proportion away from centerline **B**. Along the y-axis, the location of the centerline **C** has not justified; nevertheless, knowing that Meier has used the golden section to locate

centerline **D**, one can assume that the same proportional system or another one is used to locate centerline **C**. To prove this assumption, a square is drawn from centerline **D** with 42 ft. as its dimension, and then from the middle of the side of the square, a circle is drawn passing through the upper corner of the square. The circle passes through centerline **C** as shown in Figure 5-31.

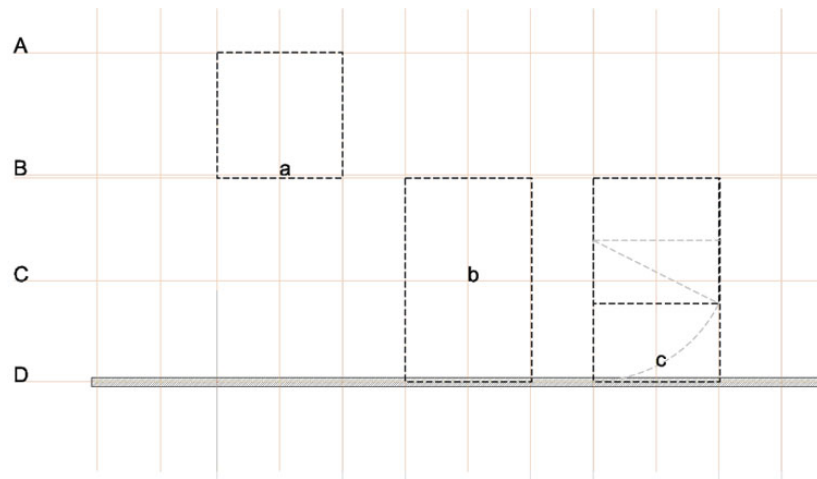


Figure 5-30 the allocation of the centerline along the y-axis: a) centerline B forms an almost perfect square with centerline A; b) shows the golden section rectangle between B and D; c) proves that the golden section proportional system was used to locate centerline D marking the spinal wall (Source: Author)

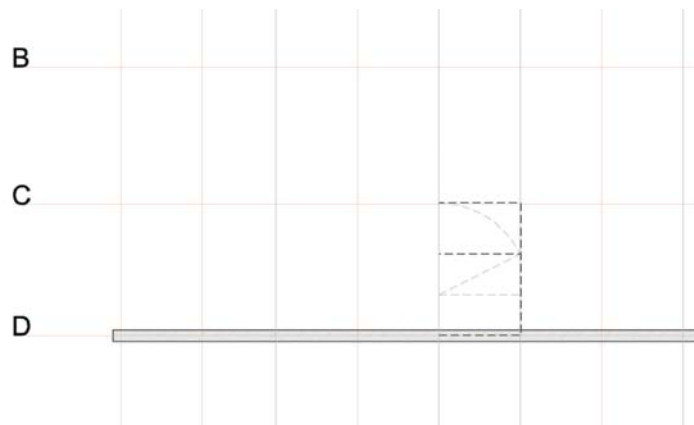
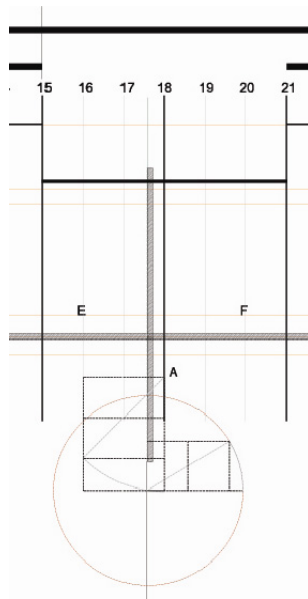


Figure 5-31 the allocation of centerline C from centerline D through the use of the golden section proportional system (Source: Author)

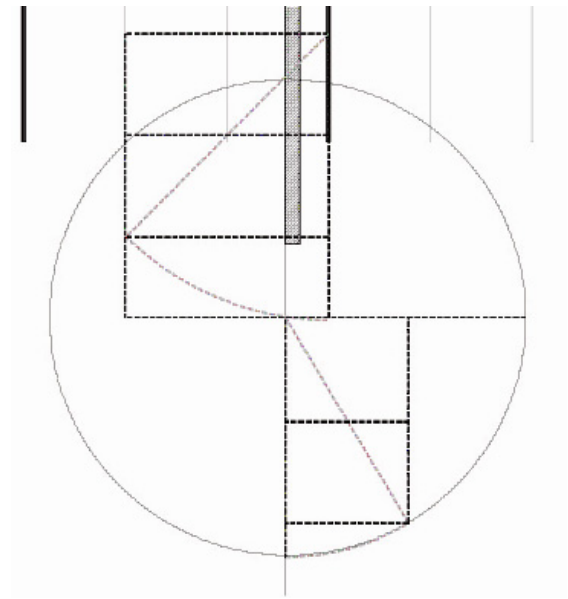
The use of the golden section to locate centerlines along the y-axis prompts the investigation whether other proportional systems were used to regulate the design of the layout of the courtroom floor or any of its elements; the overall dimensions of the District courtroom itself (42 ft.x58 ft.) looks uncoordinated at the first look but drawing a hypothetical square of 42 ft. in dimension inside the courtroom and then drawing a circle from the corner of the square that passes through the opposite corner produces a rectangle with the proportion of $1:\sqrt{2}$ which is one of the seven ‘most beautiful and proportional manners of rooms’ as proposed by Palladio in *The four books on Architecture* first published in Venice in 1570. Although the rectangle inside the courtroom does not totally match the $1:\sqrt{2}$ proposed by Palladio, it is very close; the difference in the distance is one ft. over 58 ft. or 1.7% given the differences in wall thickness (Figure 5-32). Thus, the dimensioning of the District courtrooms follows another proportional system from the Renaissance period.

Figure 5-32 the proportion of $1:\sqrt{2}$ regulating the dimensions of the District courtroom (Source: Author)

In the design of the layout out, two points remain un-investigated: the location of the circle in relation to the main building block and especially to the spinal wall and the offset of the transverse wall from centerline 15. Since the center of the circle is located on the transverse wall, these two points seem interrelated and will be investigated together. Along the y-axis, the center of the circle is located at a distance of almost 80 ft. away from the centerline **D** of the spinal wall. This distance seems unrelated to the 3 ft. tile unit that Meier uses to modulate the layout. But, if one offsets centerline **D** by 21 ft. three times downwards and then from point **A** along centerline 18 draws a circle that passes through the opposite corner, creating a rectangle of the proportion $1:\sqrt{2}$, then the center of the rotunda circle is created through the intersection of drawn circle with the centerline of the transverse wall (Figure 5-33a). The radius of the circle was calculated by offsetting the centerline of the circle two times of 21 ft. each and then drawing a circle as shown in Figure 5-33b.



a



b

Figure 5-33 the circle and its relation to the geometry of the layout: 33a shows the allocation of the center of the circle to the spinal wall: 33b shows the calculation of the radius of the circle (Source: Author)

The centerline of the transverse wall was created through the golden section proportion; a rectangle was drawn with the two centerlines passing through the edges of the side courtrooms i.e. centerline 3 and centerline 27 determining its length, and centerline 15 being the middle of the rectangle. Centerline A and the line passing through the center of the rotunda circle determined the width of the rectangle. Taking a square from the lower left corner on centerline 3 and drawing a circle from the mid point of the square that passes through the upper right corner of the square produces a golden section rectangle with its inner side determining the location of the transverse wall as can be seen in Figure 5-34.

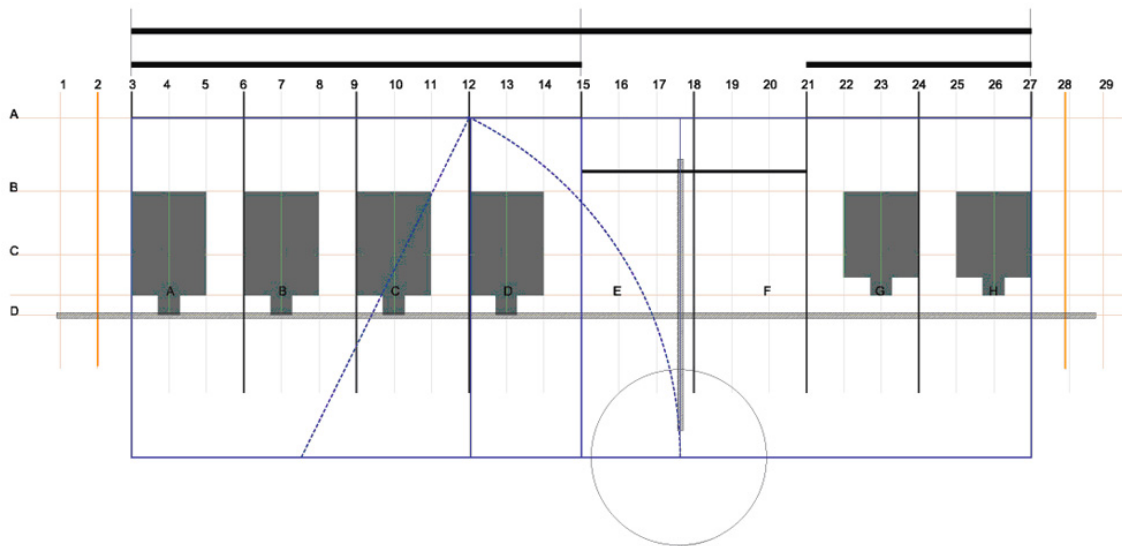
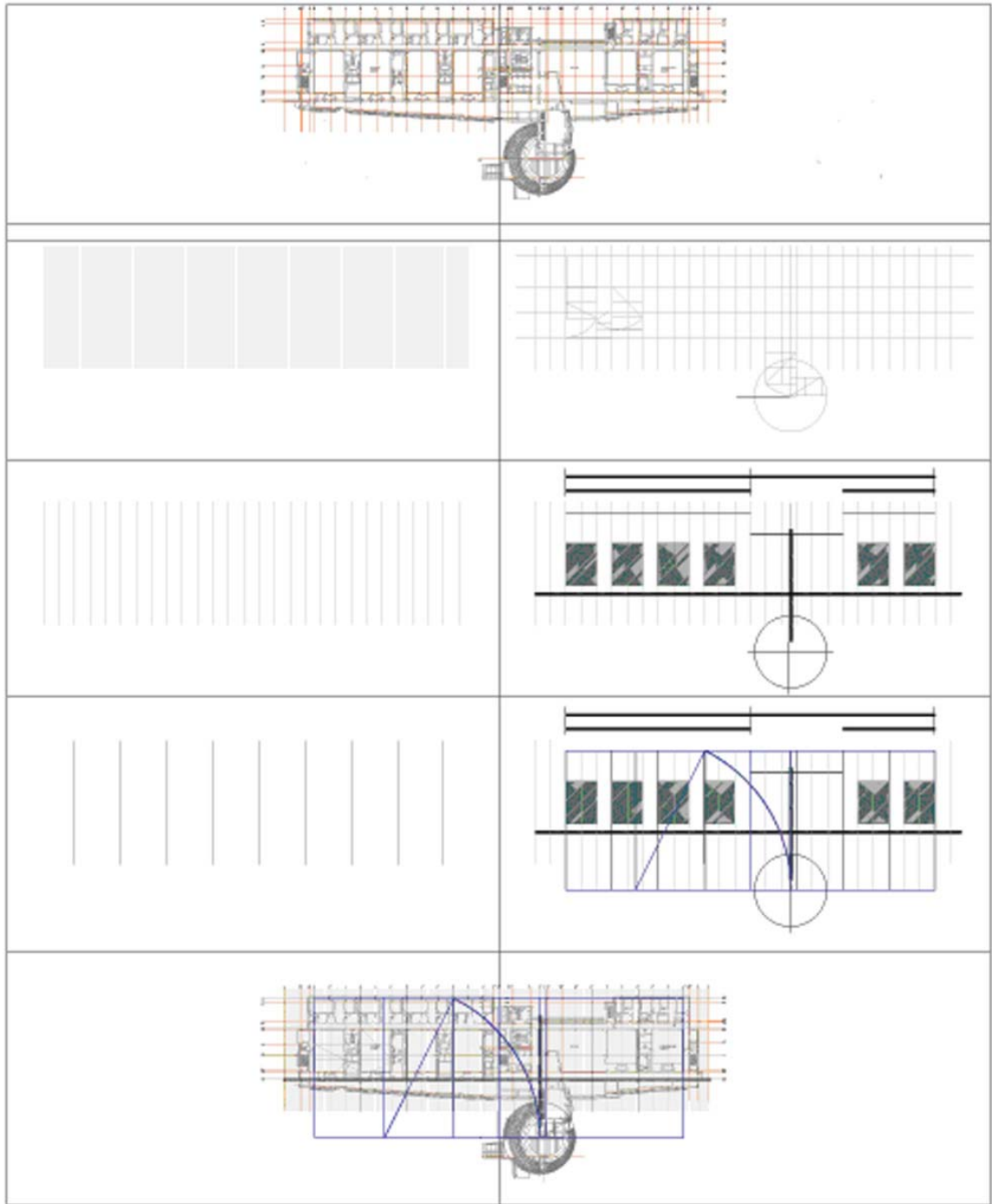


Figure 5-34 the location of the transverse wall is determined through the use of the golden section proportion (Source: Author)

The preceding analysis leads to a number of conclusions. The linear growth model adopted for the design of Islip has been subjected to two layers of order and dimensional coordination. First, the building has been ordered according to a repetitive interval along the x-axis, with a dominant structural module of 21 feet, a minor insert module of 3 feet (corresponding to tiles) and a major organizational unit of 63 feet (corresponding to the width of a courtroom and associated service zone including the restricted vertical circulation core). Second, the building has been ordered according to

proportional systems (Figure 5-35). These govern the intervals along the y-axes, so as to ensure that the proportions of the courtrooms themselves are handled with deliberate intent. At a larger scale, the proportional system is expressed in the placement of the transverse wall and the center of the rotunda. We can therefore see that the plan of the building achieves two aims simultaneously: it responds to the linear growth model and the functional diagrams of the courtroom set, both of which are generic to the courthouse building type. It also responds to principles of order that are generic to the design language. Of course, the relational principles which are generic to the building type and the dimensional principles which are generic to the language are closely interrelated in the plan. They are realized simultaneously. The ability to distinguish between them depends upon careful analysis. We may, accordingly, suggest that in this case what architecture “adds” to “building” is neither merely material forms, nor even relationships between forms, but, rather more fundamentally, principles that are applied to the relationships.

If indeed the form of Islip embeds principles of order that are generic to the design language of Meier, the question arises as to how these principles become perceptually evident, how they may be communicated to the situated subject that cannot “see” the plan, as analyzed here. This takes us to the analysis of elevations in the next sections.



**Figure 5-35 the underlying modularity and proportional systems of the Islip courthouse building
(Source: Author)**

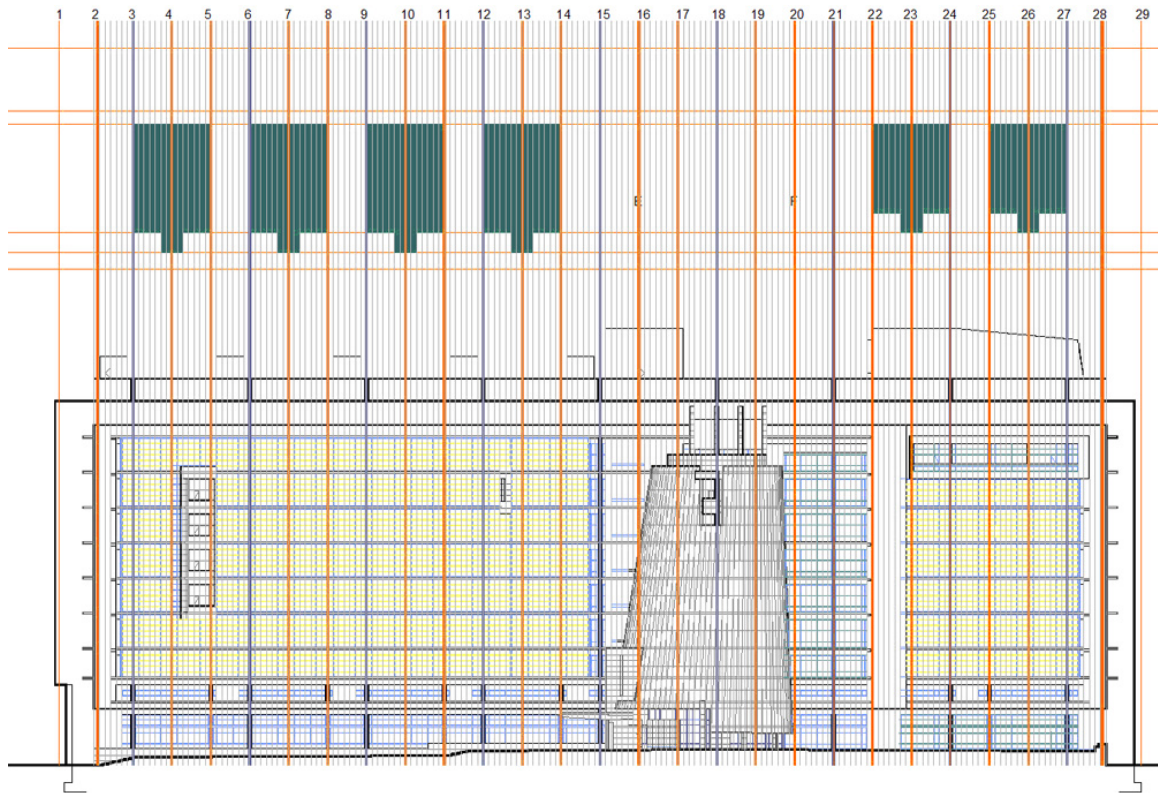
5.5 Elevations: intervals and layers.

On the upper part of the south elevation, a row of fins clearly expresses the basic module of 21 feet. Every third fin is thicker, so that the module of the composite 63 feet unit is also expressed. This is shown in Figures 5-36 and 5-37. Over the zone of the fins, the profile of the upper edge of the west wing of the building is punctuated by five modular masses, spaced over the service zones. The second and the fourth masses correspond to elevator shafts and result from functional necessity. The first, third and fifth are over corridors and jury deliberation rooms. Thus, their presence is not imposed by functional necessity but serves to further articulate the dimensional rhythm implicit in the array of courtroom sets.



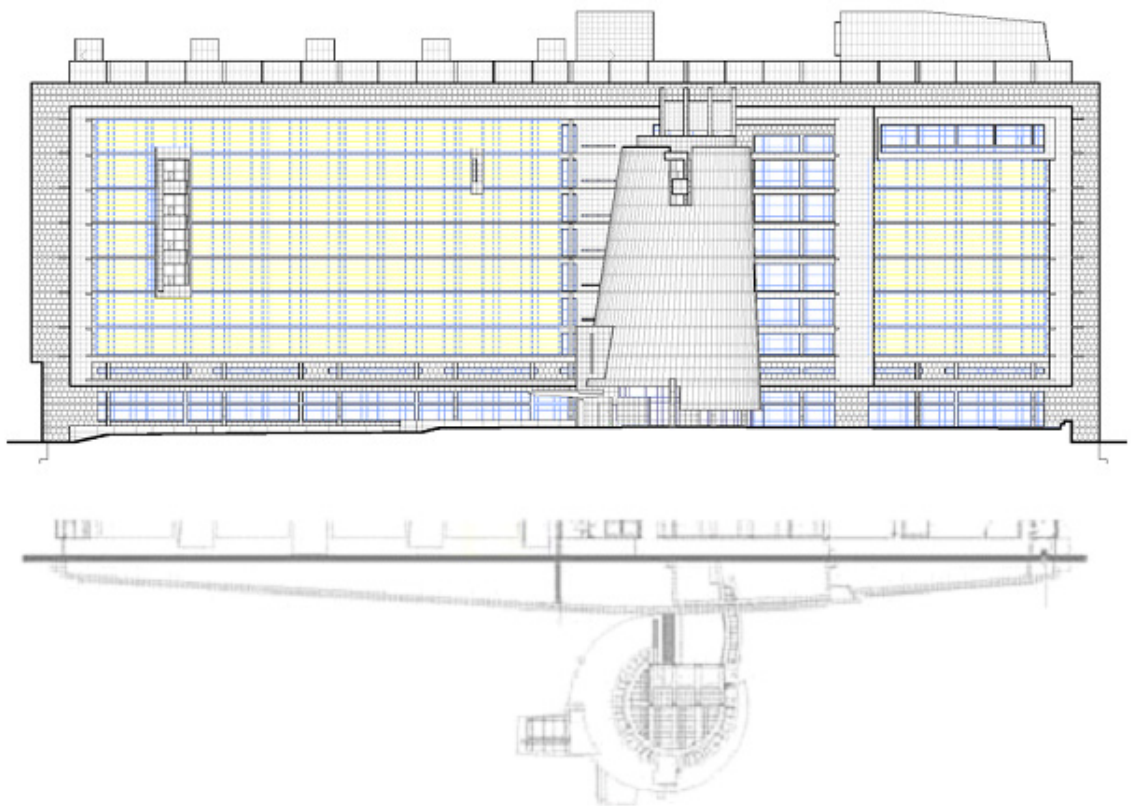
Figure 5-36 the modularity of the plan reflected in the design of the southern façade. a closer look at the relationship between the modularity of the plan and the design features of the southern façade (Source: Author)

The main elaboration of the elevation, however, occurs below the upper zone. Between the rotunda and the zone of the fins, there are three principal layers moving towards the front: the layer of the datum wall, the layer of the bowed glazed walls in front of the courtroom floors, and a layer of brise-soleil covering the glass along with the horizontal beams marking floor levels (Figure 5-38).



**Figure 5-37 the 3 ft. module reflected in the cladding tiles, smaller fins expressing the 21 ft. module, and the larger fins expressing the 63 ft. module with the courtroom and supporting functions
(Source: Author)**

The layering of surfaces is subsequently expressed as a nesting of modular rhythms. While the mullions for the glazing of the recessed floors at the base of the building on the datum wall correspond to the basic 21ft module and the fins at its crown, the mullions along the bowed walls are offset 3ft to the right and 6 feet to the left of the basic grid. Thus, a new grid is created, superimposed on the underlying one, with unequal 9 feet and 14 feet intervals. This is shown in Figure 5-39. In this manner, the stratification of layers is rendered as a superimposition of intervals, as if to provide a sense of movement along the façade.



a



b



c



d

Figure 5-38 layering a design theme in the southern façade: 24a drawing of the southern façade placed on top of the site plan showing the two bowed frames in front of the spinal walls 24b shows the layering of the brise-soleil held by the frames ‘hung’ against the granite wall with the horizontal beams indicating floor levels: 24c the overlay of the two planes holding the brise-soleil becomes frames showing the granite wall behind: 24d the eastern end of the southern façade showing how layering is accomplished.

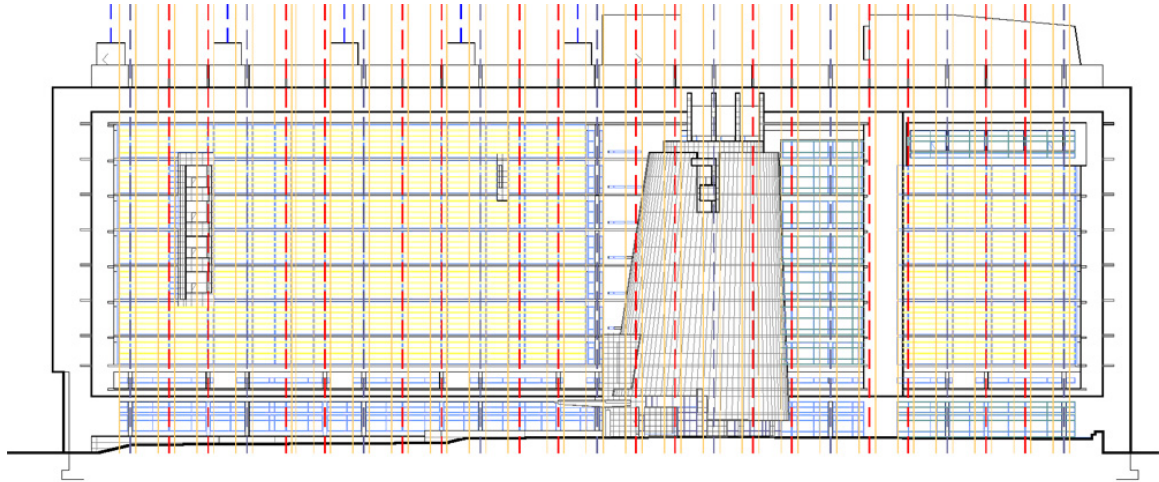


Figure 5-39 the multiplicity of vertical modules that are overlaid the southern elevation: the dashed red line indicates the 21 ft. module passing through the fins and the glass mullions, the dashed blue line indicates the module of the larger fins (63 ft.), and the orange line indicates the shifted glass mullion modules (Source: Author)

While the southern elevation is dominated by glass, the northern is mostly opaque and dominated by narrow horizontal strip-openings (Figure 5-40). This sets a binary opposition within the design of the same building, which expresses the difference between front and back, and public and private zones. Furthermore, while the southern elevation is created through layering with nested modular rhythms expressed by the intervals of the glass mullions, the northern elevation is created through fenestration with patterned strip windows. This reminds us of the concept of twin phenomenon, defined in chapter 4, which refers to the relationship between opposites in the design of the same building e.g. open/closed, transparent/opaque, and reversal as referring to the use of different design approaches or treatments within the same design such as layering/fenestration. Thus, also in the case of Islip, Meier incorporated the concepts of reversal and twin phenomenon allowing different readings of the same building.

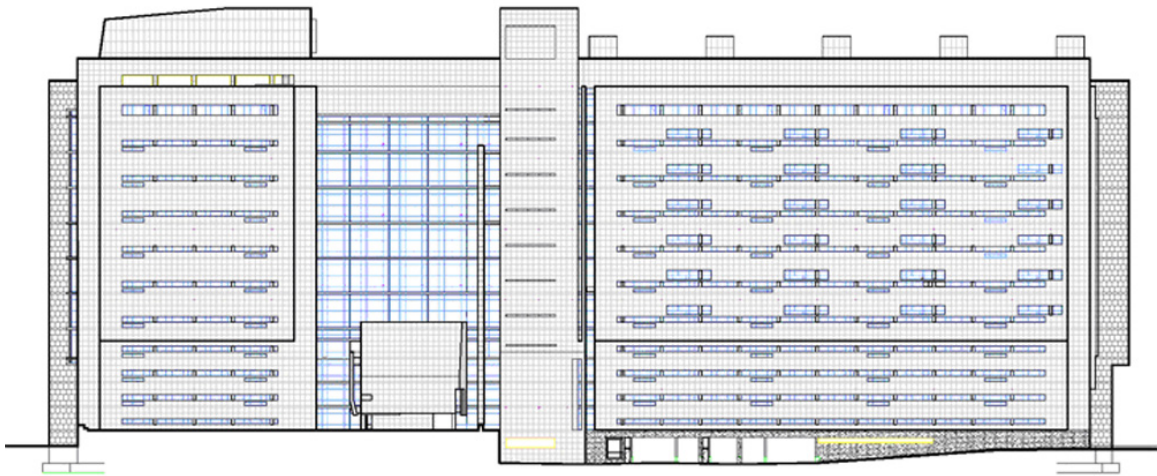


Figure 5-40 the northern elevation fenestrated by horizontal strip windows (Source: Author)

However, the expression of modularity and the superimposition of rhythms is also carried over to the northern elevation as well. Each of the white enamel masses on the sides of the glazed atrium is broken into two parts; a lower part housing office space starting from the 1st floor and ending at the 4th floor, and a slightly projected part starting from the 5th floor and ending at the 11th floor. Office space on the first four floors is characterized by continuous horizontal strips of windows punctuated by projecting beams. Underneath these continuous strips, horizontal windows are placed at regular intervals: on the left side, there are two strips of lower openings, and on the right side, there are four. This treatment indicates that there are two major intervals on the left side and four on the right side. The treatment of the judge's chambers on the left hand side of the elevation i.e. bankruptcy judges' chambers follows the same pattern as the office space i.e. a long strip of windows underlined by another shorter strip of windows. On the other hand, the judges' chambers on the right hand side of the elevation i.e. district and magistrate judges' chambers are further emphasized through strips of larger windows placed over the horizontal strips. Again on the upper part of the left elevation, the placement of the smaller windows under the strip-openings, and the placement of the larger windows over the strip-openings on the left implicitly expresses the clusters of courtroom sets behind.

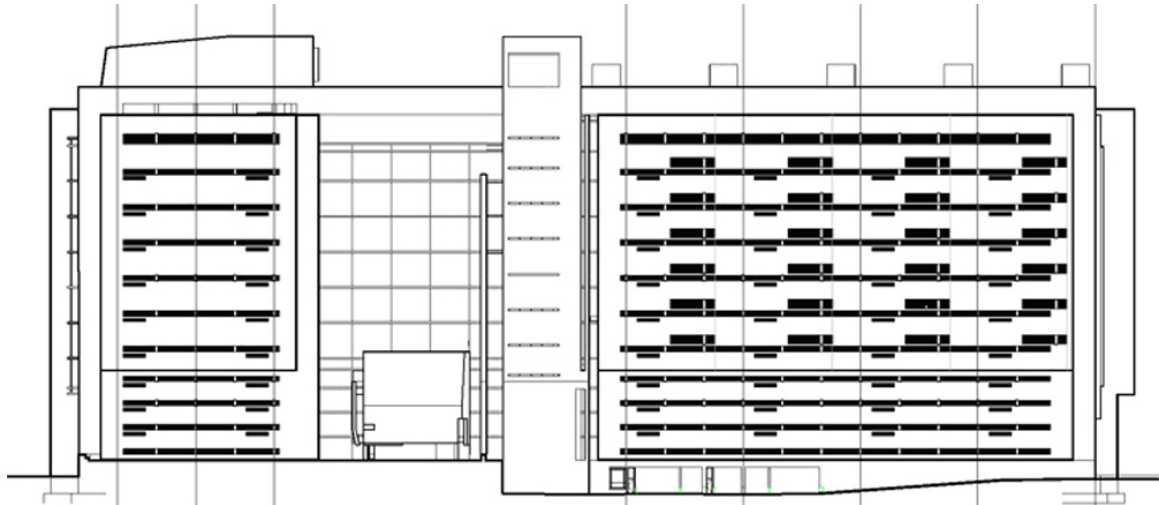
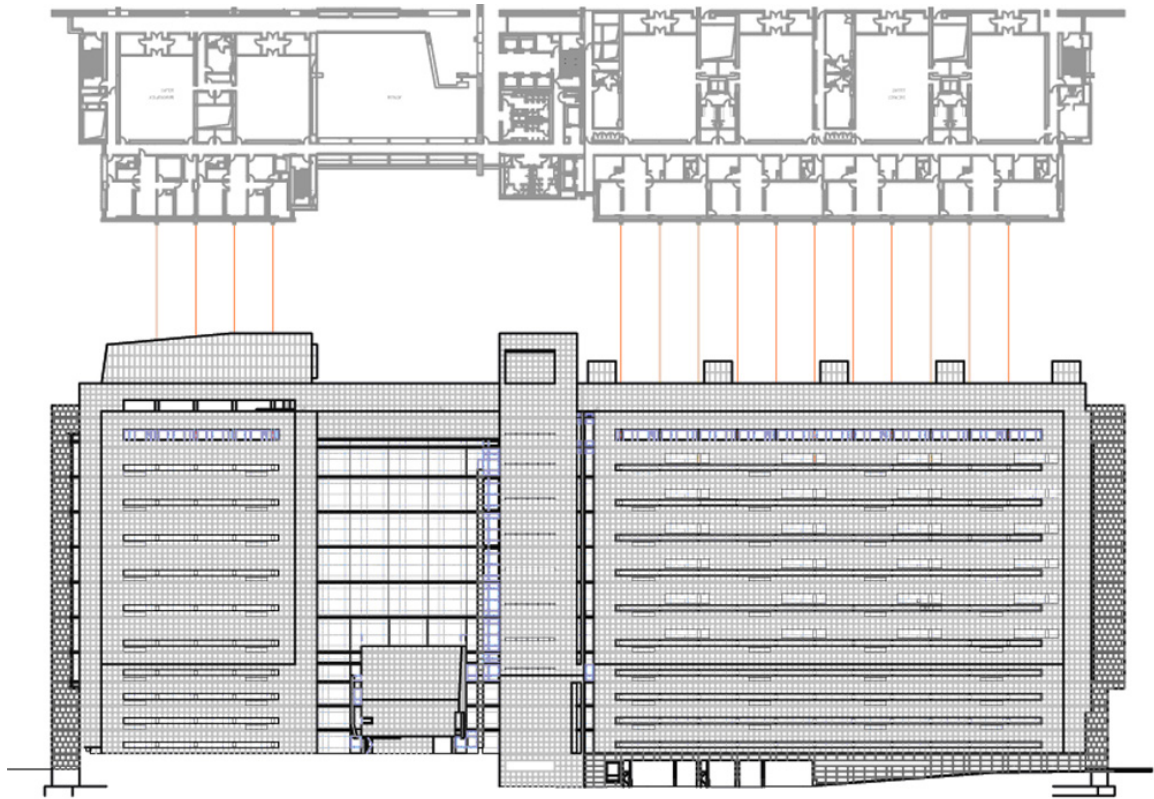


Figure 5-41 the rhythmic pattern underlying the design of the northern façade (Source: Author)

Regardless of the placement of the window strips, all strips are penetrated by projecting beams which carry the basic 21 feet module. Thus, window fenestration on the north elevation can be read as rhythmic patterns superimposed over the elevation implicitly expressing the sets of courtrooms behind the masses of the northern elevation.

In conclusion, the modular and dimensional elaboration of the major elevations interacts with the dimensional ordering of the plan. The dimensional structure is expressed in the building structure and together they work to unify built form. However, the rendering of spatial layering in terms of nested rhythms has another consequence. It suggests that dimensional discipline responds simultaneously to the requirements of visual and not only spatial and functional orders. It is as if the dimensional discipline which characterizes the language works to really integrate layering as a visual principle which governs the elevation and zoning as an organizational principle which governs the plan. The dimensional order is the unifying canvas of the composition. It is the framework which architectural design brings to the building so that intentions that bear on the organization of the program and intentions that bear on perceptual form can be addressed coherently.



**Figure 5-42 beams marking the 21 ft. interval projecting from the plan are expressed in the façade
(Source: Author)**

Thus, the previous analysis showed that within the design of the Islip courthouse building, Meier used most if not all of the formal language elements and design themes that are characteristic of his buildings and that have been identified in chapter four, while maintaining the requirements specified by the U.S Design Guide and conforming to the majority of courthouses cases analyzed in chapter three. Nevertheless, two interrelated questions remain unanswered: the first question concerns the issue of symbolism and meaning in the design of Islip Courthouse building and how did Meier address these issues in the design of the Islip, and the second is related to the most striking feature of the courthouse and its trademark, the entrance rotunda with its conical shape, which is not required by the program and that has not been featured in this monumentality in any of Meier's previous designs. These two questions will be dealt with in the next section.

5.6 Symbolism and Meaning in the Design of the Islip Courthouse Building

As mentioned in chapter three, one of the objectives of contemporary federal architecture is to reflect the dignity, enterprise, vigor and stability of the American National Government through its design and architectural style. Furthermore, when it comes to the design of federal courthouses, courthouse building should not only be symbolic of the American National Government but also “express solemnity, stability, integrity, rigor, and fairness of the American judicial process”⁴⁴. The question here becomes, how did Meier address these objectives? And, what are the design themes and elements that Meier used to express the required qualities of the contemporary courthouse building in the United States?

Following the morphological analysis in the previous parts, it will be argued that the use of ideal geometry as an ordering mechanism, the monumental design of the building, and the most intriguing feature of the building as a whole, the entrance rotunda, are an adequate answer to the above mentioned questions.

5.6.1 Islip, Ideal Geometry, and the Temple of Justice

Looking back at the analysis of the Islip Courthouse, one of the strongest design features of the building is its modularity; modularity not only as a design tool, but as an ordering principle that regulates and organizes the functions within the building, its form, and aesthetic appeal. Order seems to be a key word here that can be used to link design and justice on an abstract conceptual level; on one hand, in the case the judicial process, the aim is to bring law and justices to everybody involved in the judicial process and accordingly preserve or restore order in the community. On the other hand, in the case of architecture, the necessity for order is an inevitable element in architecture, as Le Corbusier has put it in his book *Towards a New Architecture* (1931). Thus, achieving order is something in common between architecture and justice. In architecture, one way

⁴⁴ Source:http://www.gsa.gov/gsa/cm_attachments/GSA_DOCUMENT/courthouse_R2OY58_0Z5RDZ-i34K-pR.pdf retrieved on October 15th 2004.

of achieving order in design is through the use of abstract geometry as advocated by numerous designers and architectural theoreticians. In the case of Meier, the use of abstract geometry to regulate designs is one of the strongest features of his formal language as discussed in previous sections of this thesis.

The abstract geometry Meier used in his design/s can be referred to as ‘ideal geometry’ in contrast to material geometry of ‘geometries of the being’.⁴⁵ This distinction between the abstract and the material was made 500 years ago by Alberti in the 15th century in his *Ten Books on Architecture*; Alberti distinguished between geometry and material construction of the building where the function of geometry, lineaments in Alberti’s terms, is to “*prescribe, and appropriate place, exact numbers, a proper scale, and a graceful order for whole buildings and each of the constituent parts...*”⁴⁶ This geometry, then, is an abstract geometry that is apart from the physical with its own forms and rules of mathematics; it is imposed by the human mind on the real world as an overlay or a frame of reference to a higher ideal or abstract idea. According to Unwin (2003), designers use ideal geometry to bring perfection and order to their designs, and in that sense, instill their work with a discipline and harmony that goes beyond the functionality of building and the materiality of its construction.

Accordingly, one can argue that Meier’s ordering and regulating of the design through implementing modularity, proportion, and geometry can be a metaphor to the way the courthouse brings order to the community by insuring justice and implementing the law. As such, Meier’s use of modularity and geometry assumes a deeper meaning in the case of the design of the courthouse. The point here is not to suggest that architectural ordering was somewhat derived as a response to the intention of expressing the principles of justice. It clearly was not. The point is that the projection of architecture as an ordering device subjected to abstract principles almost automatically interacts with the idea of

⁴⁵ Unwin (2003) makes a distinction between ‘ideal geometry’ and ‘geometries of being’ where ideal geometry is abstract and follows the rules and formulas of mathematics while geometries of being are related to the physical and social world.

⁴⁶ Leon Battista Alberti, translated by Rykwert and others (1988), *On the Art of Buildings in Ten Books* (c1450), p.7

justice as a set of ordering principles also imposed by human mind upon the exigencies of everyday life.

It should be noted that although Meier used geometry e.g. modularity and proportion, to regulate and order the plan, and explicitly expressed some aspects of that geometry in the design of the facades, the geometrical ordering is very explicit in plan but rather implicit and uneasily depicted in the design of the overall form of the building; as such, Meier needed a more direct expression of the importance of the building. Such an expression can be found in the size of the building, which although composed of 12 stories, because of the double height of the courtroom, it is actually 22 stories in height, and can be seen from the highway nearby. This is confirmed by what Meier recalls about his daughter's comment when she visited the courthouse before its completion; because of the sheer size of the building, the daughter commented that it was an 'important building'. Accordingly, one can hypothesize that Meier wanted to create a monument for justice, or in other words a 'temple' of justice.

The way 'temple' is used here, does not mean an actual temple; rather, it is used in a metaphoric or philosophical sense following Unwin's (2003) distinction between the architecture of the 'cottage' and that of the 'temple'. In Unwin's definition, a building can be regarded as a temple when the design of the building goes beyond the materiality of construction and the functionality of the building to address higher values and ideals. Unwin (2003) gave basic characteristics of the 'archetypical' temple; it is raised on a platform that replaces the 'uneven' ground; it stands prominent in an exposed location; its materials are abstract and perfectly finished and carved into abstract geometric forms; its scale does not relate to the usual size of the human being but responds to the larger stature of the 'God' it is dedicated to; its function goes beyond the immediate bodily needs and functions and accordingly, its design is not dictated by programmatic needs but is rather produced by geometry and proportion; it has its own unique design in its surroundings and does not echo the architecture of the surrounding buildings.

Looking at the design of the Islip Courthouse Building, it has all the characteristics of the ‘archetypical’ temple; the parking is sanctioned to the far side of the site; it is built in a prominent site and the building is raised on a platform that is plain and minimalist in design; it is clad in perfect white tiles with high technical precision; its design is regulated and ordered through the use of geometry not but functional requirements alone; its architecture does not echo any of the surrounding buildings or architectural styles; and more importantly, its scale overlooks and overshadows all the buildings surrounding the courthouse. Thus, one can rightfully argue that this building can be seen as a ‘temple’ of justice.

One might argue that the creation of a ‘temple’ of justice was not Meier’s intention and it is an induced reading into the building. The answer to this argument is very simple; if this reading arises from the formal structure of the building as discussed in chapter two, then the design of the building has gone beyond the requirements of the program, exceeded the intentions of the designer and acquired a life of its own where the design suggests various readings and interpretations.

Thus, the symbolism of justice in the design of The Islip Courthouse has been achieved through the use of ‘ideal’ geometry and the monumental size of the building. The symbolism, however, is further elaborated and specified by the use of the entrance rotunda. This will be discussed in the following section.

5.6.2 The Entrance Rotunda: Meaning and Symbolism

The entrance rotunda with its circular base and asymmetrical conical shape marks the main public entry to the courthouse that rises for nine floors and is clearly visible from the highway nearby the courthouse (Figure 5-43).



Figure 5-43the entrance rotunda standing as a sculptural figure in-front of the courthouse building
(Source: Frampton, 2002)

The entrance rotunda has been celebrated by many writers and critics as the most distinctive feature of the courthouse: for Marshal (2001), the rotunda, which he described as a '*lopsided round cylinder*', although compared to a grain silo or a nuclear power plant reactor, provides the 'wow' factor that is associated with great public buildings. Giovannini (2001) considered the rotunda as the '*center piece of the façade*' that signals '*a different and evolved Meier*' and furthermore, acts as a 'deviation from the conventional typology of the American courthouse.' This raises an interesting question of why did Meier use a circular entrance hall at the base and extrude it as a conical form, not

as a cylinder, in the third dimension, and furthermore where did such a form come from if it is not from the distinctive Meier formal Language?

To partially answer the second part of the question, one has to go back to the sources of the major design features of the courthouse building; the design charge and the design brief. Looking at the design charge as identified in chapter three, one can find no reference that specifies a separate entrance hall for the courthouse building not mentioning a circular entrance with a conical form that extends for nine floors. Nevertheless, a functional advantage for the use of a separate mass for the entrance might be the added security where in the case of any security breach, the entrance hall can be isolated and contained by closing the corridor linking it to the main courthouse building. Looking at the design brief or the formal language of Meier, Meier has a long tradition of using circles or parts of circles in projects in general; for example, the Siemens Headquarter Building (1988), the Grotta House (1989) and against linear blocks or linear design elements in particular; for example the competition entry for the Library of France in 1989, the Canal+ Headquarters (1992), the Ulm Exhibition and Assembly Building (1993), the Weishaupt Forum (1992), the Hypolux Bank Building (1993), and the Barcelona Museum of Contemporary Art (1995). In the entry for the library of France, and the Canal+ Headquarters, Meier used the circle in plan but extruded it as a symmetrical cone in the third dimension (Figure 5-44).

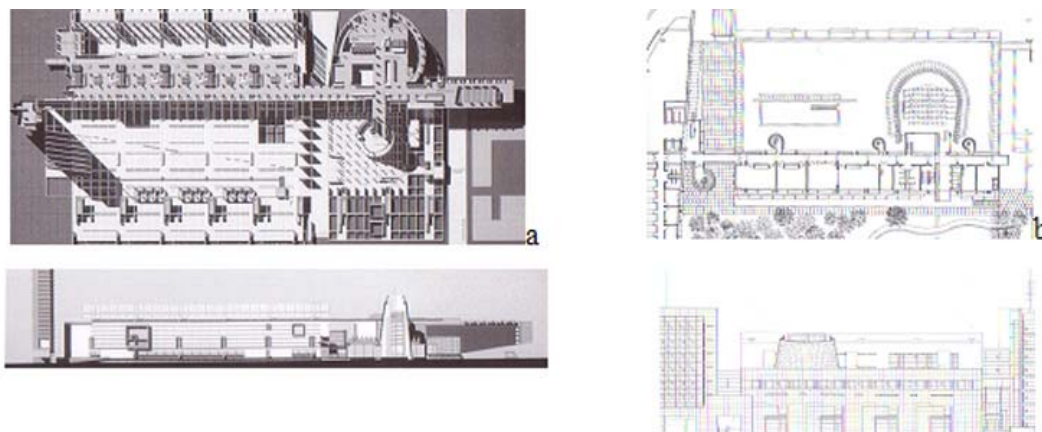


Figure 5-44Meier's use of circles extruded as cones in his designs: 50a the library of France where the circle is the entrance hall 50b: Canal+ the circle as the auditorium. (Source: Frampton, 2002)

In three of the formerly mentioned projects, a full circle was used as an entrance hall; the Library of France where the circle is the main entry hall with the complex of the library, the Hypolux Bank building where the entrance hall was designed as a circle separated from the main block of the bank, and the Barcelona museum of Contemporary Art where the entrance was an independent circle integrated with the main block of the museum (Figure 5-45).

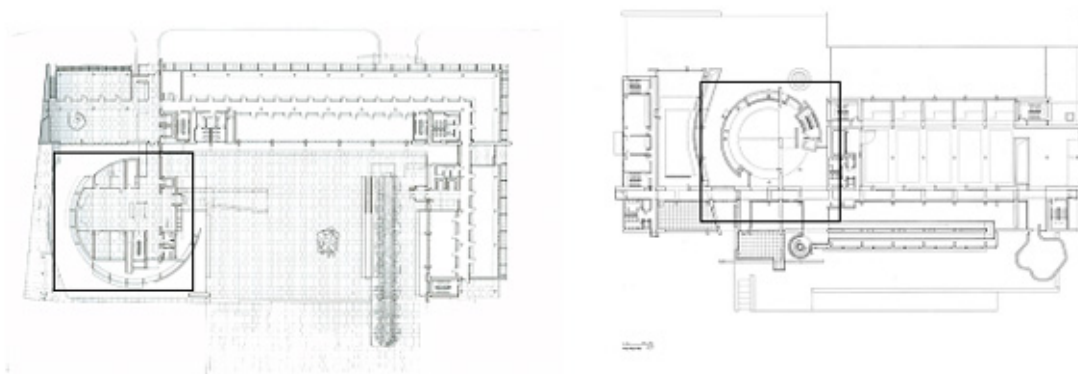


Figure 5-45 Meier's use of circles as entrance halls: 5-45a the circle as a separate entrance hall in the Hypolux Bank: 5-45b the circle as an entrance hall integrated within the building in the Barcelona Museum of Contemporary Art. (Source: Frampton, 2002)

Furthermore in the three precedents, the circle is not only the entrance hall but is also connected to the main block of the building via a transverse wall just like the case of Islip. Thus, these projects are precedents of Meier's use of the circle as the plan for the entrance hall, and in that sense, Islip is not unique. Nevertheless, in the two constructed precedents i.e. the bank and the museum, the circle is extruded as a cylinder in the third dimension that is not used in its pure form but articulated through the use recessed circular horizontal and vertical planes, while in the Library of France the entrance hall is extended as a symmetrical cone that is recessed at the top. This leaves the entrance rotunda in Islip where the circle is extruded as a conical shape that is not symmetrical and articulated with projected planes unique in its design, deferring from the entry for the

Library of France and unprecedented in any of Meier's projects and is not repeated in any of the projects after that (Figure 5-46).

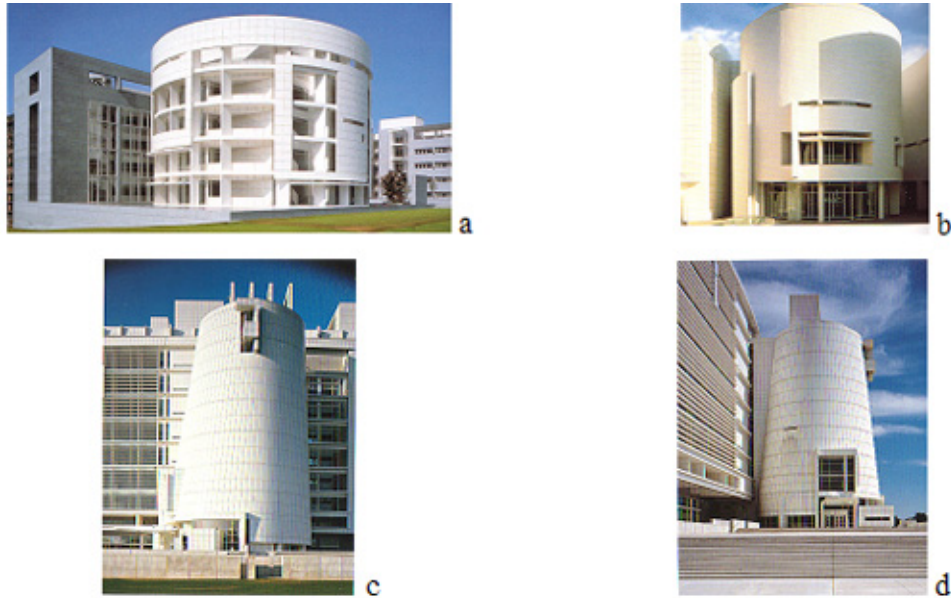


Figure 5-46 Meier's extruded circles as articulated cylinders in the Hypolux Bank in a and the Barcelona Museum of Contemporary Art in b, while the circle was extruded as a conical form in the Islip courthouse building in c and d (Source: Frampton, 2002)

Meier's justified the use of the entrance rotunda in Islip, although he has previously used an entrance rotunda in both the Hypolux Bank and the Barcelona Museum, by stating that *"coming into the rotunda, an open top-lit lobby that was different from the main body of the building, might be analogous to the way in which a domed entry might have signified a courthouse 100 years ago."*⁴⁷ Thus, Meier regarded the entrance rotunda as a modernist expression that signifies the building as a courthouse not as an office building.⁴⁸ The validity of Meier's metaphoric explanation for the use of

⁴⁷ This is a quotation from Meier's comments on the design of the Islip Courthouse building in the recent publication *Volume 2 of Changing the Course of Federal Architecture, Vision+Voice* 2004.

⁴⁸ Marshal (2001) also regarded the entrance rotunda as a signifier of a public building, while Giovannini (2001) in his critique of the building remarked that the opaque rotunda is a metaphor for the proceedings of a trial where the judicial process is can be neither linear nor clear and unexpected things can happen and so

a circle for the entrance can be debated between acceptance and rejection; nevertheless, it does not give a clue about the choice of the conical form for the entrance rotunda. One has to search somewhere else for an explanation for the conical form.

As the search for an explanation for the conical form in Meier's recent repertoire of design elements and themes did not yield a full answer, one has to go beyond Meier's immediate formal language into sources for Meier's inspirations. One of the greatest inspirations for Meier is his modernist tradition, especially that of Le Corbusier, where Meier has always confirmed his debt to Le Corbusier in varying degrees. But among which of Le Corbusier's works would one find the source of the asymmetrical conical form? The asymmetrical conical form of the entrance hall gives us a visual clue; Le Corbusier used a conical form in two of his projects: the cone that covers the National Assembly Hall in Chandigarh in 1952 (Figure 5-47), and the unbuilt St. Pierre Church at Firminy-Vert in France in 1963 (Figure 5-48).⁴⁹

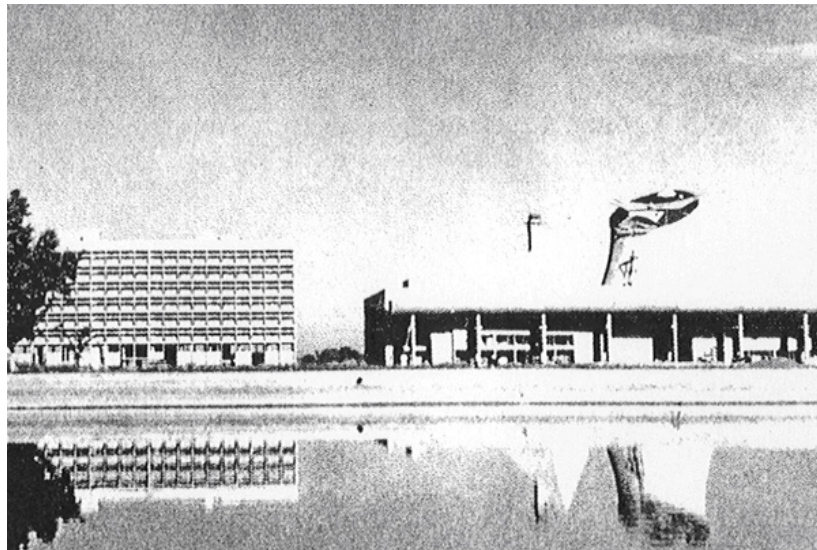


Figure 5-47 the Assembly and Secretariat at Chandigarh, Le Corbusier 1952 (Source; Curtis, 1986)

the opaque rotunda hide behind its closed walls an expansive space filled with light and unexpected turns leading to other events and spaces.

⁴⁹ The church was not constructed at the time of its design and up until 1978 only the first two floors of the church were constructed due to lack of financing, but it is currently under construction and will be opened in summer of 2006.

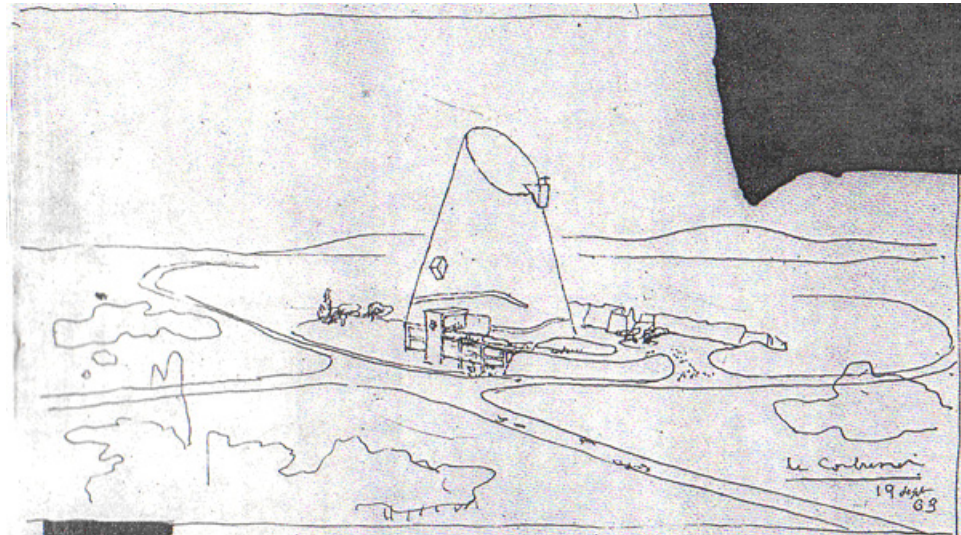


Figure 5-48 a sketch of the St. Pierre Church at Firminy-Vert, Le Corbusier 1963 (Source: Brooks, 1984)

Looking at Figure 5-48, the visual analogy between the conical form of the Church with the Cross on top and the projected entry at the bottom is very strong with the conical form of the entrance rotunda, the articulation on top, and the projected entry canopy (Figure 5-49). Such a resemblance would make a plausible case that Meier might have used the form of the Church form as a metaphor for the entrance rotunda at Islip. This probes us to look deeper into the design of St. Pierre Church at Firminy-Vert

As an Architect, Le Corbusier designed only three religious buildings, all in France, and only two of them were realized: the pilgrimage chapel at Ronchamp and the monastic college of La Tourette. The third, which is the Church of Saint-Pierre de Firminy, the last of Le Corbusier's unfinished projects, finally took shape where it celebrated its topping out ceremony in April of 2005, more than 40 years after its conception.

The Saint-Pierre at Firminy-Vert is radically unlike Le Corbusier's other churches and unique among religious buildings. Its geometry is produced by the projection of a square onto a circle, where the square base of the church containing functional rooms is

surmounted by an enormous truncated cone housing the sanctuary, which is lit by an array of protruding "light cannons" (Figure 5-50) This is made possible by a complex hyperboloid shell enclosure made of concrete. According to Fischer (2005)⁵⁰ this metamorphosis from the square to the circle might have represented for Le Corbusier the transition from the earthly to the spiritual realm and one made possible. The hyperbolic shell, along with the winding pathway into and through the sacred space is the central elements of Saint-Pierre Church.

José Oubrierie 72, the architect in charge of Saint-Pierre's completion, worked for Le Corbusier from 1957 until the Le Corbusier's death in 1965. As a young man, he helped develop the Firminy church design from the very first sketches. Oubrierie did not attempt to explain the building's symbolic associations or why Le Corbusier chose such a form; *"I am too close to the nuts and bolts to be poetic,"* he said. *"I leave that to others, like my younger colleagues."* Many have pointed out that the church resembles a nuclear cooling tower, or maybe one of those volcanoes seen on Volvic water bottles. Others refer to it as the *seau à charbon*, the coal bucket, a signifier linked to Firminy's industrial past. Interpretation is encouraged by the fact that Saint-Pierre is cast almost entirely in concrete, a material Le Corbusier preferred in his later years for its economy and plasticity (Cited in Fischer, 2005).

Despite the fact that it might be an interesting topic to pursue, it is of no interest to this thesis to investigate why Le Corbusier used the conical form; rather, this thesis is interested in why Meier used the church with its conical form as a metaphor for the entrance rotunda in the courthouse? The answer to this question besides echoing the domed entrances to courthouses 100 years ago in Meier's terms is to suggest, via the Corbusian tradition, that justice is sacred.

⁵⁰ Jan Otakar Fischer is a writer for the Daily Herald Tribune. This information is from an article by Fischer published in the Daily Herald Tribune published under the title *Le Corbusier, by Design* on May 12th 2005. Retrieved from <http://www.iht.com/articles/2005/05/11/features/corbu.php> on January 5th 2006.

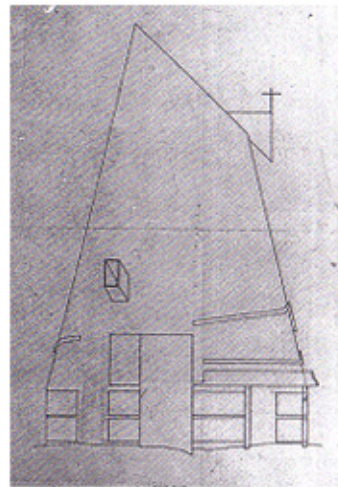
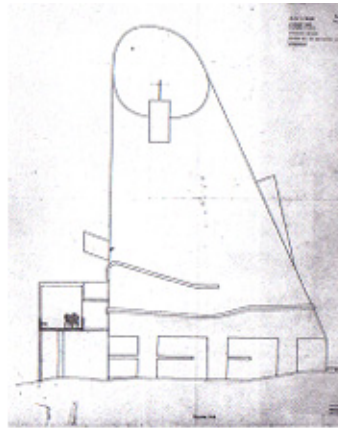


Figure 5-49 the visual analogy between sketches of the Church at Firminy-Vert and the entrance rotunda at Islip (Source for Firminy: Brooks, 1984)

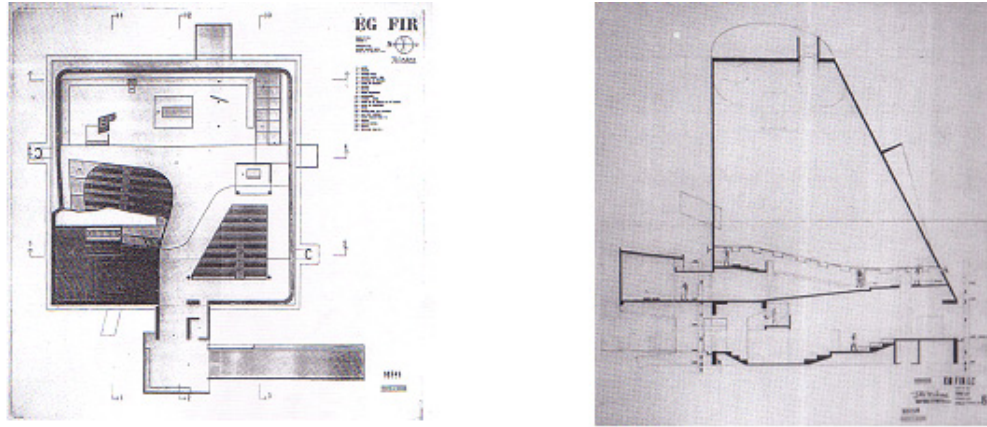


Figure 5-50 one of the study plans of St.-Pierre Church and one of the study sections showing the square base of the Church and the conic extension of the sanctuary (Source: Brooks, 1984)

In other words, as the church is a place where the rituals of religion are practiced; where believers not only practice their faith, but also feel welcomed, protected, and more importantly equal in-front of a higher power, the church becomes a sanctuary, a symbol of not only religion but also of protection, equality, and justice. Thus, the form of the church conveys these qualities, evokes feelings of justice and equality within visitors of the church, and more importantly becomes a symbol of these qualities. As such, Meier chose the Corbusian contemporary interpretation of the form of the church, especially that of an un-built church, to be the metaphor for his entrance rotunda where standing in-front of the Islip Courthouse, the conical form would remind visitors of the courthouse that as in the church, the courthouse is a place where everyone is welcomed, protected, and more importantly equal in the judicial system. Thus, suggesting that justice, as religion is sacred. Ironically enough, the opaqueness of the entrance rotunda, as well as the change of direction to enter the courthouse might suggest as Giovannini has previously pointed out that the judicial process is not as direct, transparent, or as linear.

Thus, to conclude this part, through the metaphoric use of the St.-Pierre Church form as the entrance rotunda for the courthouse building, Meier went beyond the functional demands of the charge, beyond the ordering of the plan and elevation through the use of ideal geometry, modularity, and layering, and addressed the symbolic issues

embedded in the design of the courthouse through evoking a deeper meaning relating the design of the courthouse to that of a church and thus suggesting that justice is sacred.

One point worth mentioning here before concluding this chapter; whether Meier has implicitly used St.-Pierre Church at Firminy-Vert as a metaphor for the entrance rotunda at Islip or not; whether critics or visitors perceive the rotunda as intended by Meier or provide their own interpretations e.g. it looks like a nuclear power plant, the design of courthouse in general, and the design of the entrance rotunda in particular proves the ability of the designed object, a courthouse building in our case, to go beyond the immediate requirements of the program i.e. the charge; to go beyond the intentions of the design i.e. the brief, and starts suggesting its own interpretations and associations due to its characteristics i.e. its formal structure and logical form. As such, the designed building can be regarded as resultant of design as formulation.

5.7 Chapter Summary

The aim of this chapter was to investigate, through morphological analysis, the interaction between Richard Meier's formal language i.e. the brief, and the functional requirements of the constrained courthouse program i.e. the charge, in the design of the Islip Courthouse building. The morphological analysis tackled 2-D and 3-D aspects of the building by first identifying the functional components of the courthouse and the way Meier addressed the functional requirements; and second, identifying elements and themes of Meier's formal language that were employed in the final form of the building. The morphological analysis provided an informed insight of how Meier addressed the design of the Islip Courthouse functionally and formally, and furthermore, identified design elements that Meier used to induce symbolism and meaning that go beyond the immediate function and formal language of design.

Functionally, Meier organized the functional components in a linear configuration with six courtrooms per floor, as identified in chapter three, where the courtrooms i.e. interface zone, secure zones, and jury deliberation rooms were sandwiched between the

public zone on the southern side and the private judges' chambers on the northern side. Meier major thrust over other courthouses with linear functional configurations had several components: the first is manifested in creating a two-step entrance process where the public enters through the entrance rotunda planted on the plaza as a first step, and turns left to pass through a corridor leading to the main atrium where they can disperse through the building as a second step. The second lies in creating an intermediate zone in the sandwiched interface zone separating the district courtrooms from the bankruptcy courtrooms. This intermediate zone houses a service core with restrooms and elevators and more importantly the main atrium that cuts through the full height of the building. As having an atrium is a characteristic of courthouses with concentric functional configurations, the atrium becomes one of the major differences between Meier functional linear configurations and other linear courthouses.

To configure the functional components, Meier used a rectilinear block to house the main functions of the courthouse, a conical rotunda as the main public entrance in-front of the building, and rectangular mass to be the special Proceeding Courtroom at the back of the building, thus, playing one of the main characteristics of his formal language; the juxtaposition of several simple geometric forms against each other to create an articulated but integrated overall form. The three masses of the courthouse were linked together via a transverse wall that cuts through the building from south to north. The linearity of the courthouse was augmented by the spinal granite wall that cuts through the building from east to west. In plan, the two walls play important functional roles: the spinal wall not only separates the public zone from the interface zone, but also defines the main public circulation corridors along the southern façade, and the transverse wall defines public circulation from the entrance rotunda towards the circulation and service core. On a more abstract level, the spinal wall enhances the metaphoric role of the building as a wall that defines the minimalist public plaza designed in-front.

Within the courthouse main block, Meier did not arbitrary construct the functional areas specified by the program; rather, he geometrically regulated the functional distribution of activities according to strict modularity and proportional systems:

perpendicular to the x-axis i.e. the long side of the courthouse block, Meier divided the layout into eight 'mega' modules of 63 ft. each and then divided each 'mega' module into three intervals or smaller modules of 21 ft. each where a courtroom occupied two intervals and the remaining interval housed courtroom supporting functions. The regularity of the mega modules were maintained even when functions other courtrooms occupied them. These modules were used not only to distribute the functions but also to locate the structural system of the courthouse building. The dimensioning of the modules and intervals was not arbitrary either; it was based on a 3 ft. module derived from the dimensions of the signature cladding tiles Meier used in the building. Along the short side of the courthouse block, the 3 ft. module was also used as a geometric base, but Meier used the golden section proportional system to locate the structural elements within the building and the two main walls cutting through the building: the spinal wall and the transverse wall. Meier further used the proportional geometry of $1:\sqrt{2}$ to size the courtrooms and determine the location of the entrance rotunda.

The modularity of the layout was also reflected on the design of the elevations where through the use of projected beams on the northern facade, glass mullions on both southern and northern facades, and the projected fins on the southern elevation, and the volumes on the top of the building, as well as the cladding tiles, the internal functional and structural division of the plan is made visible and perceptually. As such, Meier's modularity works in two ways: it organizes rhythmic intervals that can be read in the elevation, and organizes functional modules in plan. Thus, modularity mediated between the perceptual aspects of the building, the structural system, and the functional organization in the plan, thus, became an abstract organizing principle that unites the plan, the elevations, and the overall form of the building rather than a mere constructional convenience method, or mere design tool.

Modularity is not the only design theme Meier used to linked the plan to the elevation and overall form of the building; Meier expressed the linear functional zoning of the plan in the three dimensional form of the building through layering. Through incisions, glass recesses and cuts, and stacking of volumes, in the west and east facades,

Meier perceptually expressed the functional zoning of the plan and made it explicit to visitors coming from the parking even before entering the building. Furthermore, layering is not only used in the direct perceptual sense, but also in a more abstract level giving the building more conceptual depth by relating to modularity and rhythm; the handling of the long southern facade as two slightly bowed glass curtains with the brise-soleil played against the granite wall, along with the accentuated protruding fins, along with the rhythm of volumes on the roof, and the distribution of glass mullions and columns that are retrospectively linked to the functional modules, the visual impression given is that of several superimposed or layered elements that play various rhythms, which follow the same underlying module but reflect varying grid lines or functional intervals. Thus, the southern facade works as a complex weaving of layers; it acquires not only the literal visual depth of the functional zones, but also a conceptual depth arising from the rhythmic layering of design elements.

Another generic design theme of Meier's formal language is reversal or twin phenomena. This theme is manifested in the different treatments of the southern and northern facades; layering versus fenestration respectively, and the opaqueness of the entrance rotunda against the transparency of the expansive glazed southern facade. Twin phenomena can be also traced on a more abstract level in the relationship between the strict underlying modularity or grid and the juxtaposition of the circle against the wall and the rectangle in a manner that suggests 'free' composition. In that sense, the static and rigid ordering of the grid, which is used as a basis for organizing the layout, is countered by the dynamic 'free' composition resulting from the use of circles, gently curving glass frames, and planes against each other.

The creation of an 'architectural promenade' is one of Meier's formal language design themes that is manifested in the design of Islip. By placing the entrance rotunda on the far end of the main building block, away from the parking block, instead of the near end, Meier is forcing visitors to visually experience the west elevation, a portion of the southern facade, going into the rotunda, turning into the corridor, going through the granite wall and experiencing the glazed atrium, and then returning back to reach their

destination on upper floors, all within an interplay of light and dark, opaqueness and transparency, Meier creates an architectural promenade that goes beyond the functionality of the building.

Meier's attempt to reflect the dignity and vigor of the judicial system can be linked to the use of abstract monumental and sculptural design of the building, and especially that of the entrance rotunda that is metaphoric to the domed entrances of historic courthouses. Furthermore, through vanishing the parking to the side of the site, and designing a raised clean plaza where the courthouse stands as an object of power, Meier suggested that justice is sacred and rises above the daily and mundane. The sanctity of justice is further strengthened by the asymmetrical conical form of the entrance plaza that metaphorically links the courthouse to the design of St. Pierre at Firminy-Vert suggesting that as religion, justice is sacred.

6 CHAPTER 6: CONCLUSIONS

This thesis has discussed architectural design in terms of the interaction between a design program and formal design language. Both program and language were described in terms of spatial and formal structures and principles. Thus, the interaction between program and language was reconstructed as an interaction between formal structures of different kinds, not as an interaction between entities expressed in different media. In this respect, the thesis extends the work of Markus (1987) who has analyzed program in terms of linguistic descriptions of building requirements only and subsequently sought the imprint of these descriptions in building plants. Here, the imprints of programmatic requirements were formally described on both topological and geometrical levels. The resulting “spatial signatures” of program were treated as much as part of the program itself as the linguistic descriptions, because it is only by being able to recognize those imprints that we can recognize the relevance and import of the linguistic descriptions. Furthermore, this thesis extended our understanding of describing Richard Meier’s work and thought not only by providing verbal descriptions of his works and projects, as do authors such as Rykwert, Frampton, and Giovanni, but more by identifying and characterizing the major themes and design elements of his formal language, presenting them in terms of formal structures, and showing how are they actually deployed in the design of his buildings.

Because program and language were described in spatial and formal terms, it has become possible to track their interaction in precise analytical ways. In some respects, their interaction has been treated as a matter of establishing correspondences between different kinds of descriptions of spatial patterns. For example, the topological or simpler geometrical diagrams which express programmatic requirements have been set against the measured drawings which express design ordering principles. Thus, the thesis has made a methodological contribution. It has clarified the manner in which understanding design as the satisfaction of multiple descriptions of form can provide the study of the interaction between program and language with greater rigor, precision and scope for discovery.

In terms of the design program of the Federal courthouse buildings, which are considered to be complex buildings with a strong program that has strict programmatic requirements in terms of zoning and circulation, the thesis concluded that topologically within the sample studied, there is a limited number of connectivity genotypes with stable pattern of relationships between functions that underlie diverse courtroom floor plans; there are seven graphs underlying the design of courtroom floor plans in 25 buildings, however, there is a dominant graph that represented 15 cases. In terms of integration, the thesis found that there is a very strong tendency for the private circulation i.e. circulation of the judicial staff, to be the integration core of the building making most courthouses, therefore, inhabitant-center buildings. On the geometrical level, there is a greater degree of variation in the patterns of geometrical configurations that accommodate the program where more than one geometrical configuration can realize the genotype. Thus, the restrictions imposed by the program inscribed in the spatial structure of courthouse buildings limits the number of topological relations but does not pose as many restrictions on the geometric relations or configurations realizing the topology of the program. However, clear dominant trends are identified both with respect to connectivity genotypes and with respect to functional diagrams.

The thesis found that Meier's design for Islip can be read as interplay between the real and analytic i.e. pragmatic requirements, site considerations, etc..., and the abstract and conceptual reflected in the way the designs are ordered to express abstract themes. The formal design language of Richard Meier as it applies to both Islip and the Barcelona Museum of Contemporary Art can be characterized by the juxtaposition of a set of forms imposed over a grid/s mostly derived from the cladding system Meier uses and oriented according to site considerations. This interplay of the forms, mainly circles placed against linear design elements, is regulated by the use of geometry and proportional systems. These forms do not have a fixed function in his designs; rather, they assume different functions depending on the type of the project. The formal language has a set of formal vocabulary that exceeds the most elementary elements of the column and the plane to include white metal panels, expansive glazing, pipe railing, glass blocks, piano curves, and brise-soleil among others. Through the configuration of his designs, several generic

design themes materialize and assume a form particular to his formal language. These reoccurring design themes include visual layering that expresses functional zoning, syntactic centrality created through the intersection of two perpendicular walls, *architecturale promenade* as means of experiencing the building, tension through the use of static versus dynamic design elements, and reversal through the use of contrasting design approaches e.g. layering versus fenestration, or design treatments e.g. open versus opaque.

As a consequence of the investigation of the courthouse design program and the formal design language of Meier as it applies to Islip, this thesis supported the distinction or separation between form and function in architecture even in the case of a strong functional program and well established formal language. As seen in chapter three, the functional program of the federal courthouse is manifested in a number of connectivity graphs, which in return are expressed in a variety of geometric configurations that are ultimately expressed in a number of architectural styles. Furthermore, chapter four demonstrated that the formal design language of the Richard Meier was used to design a variety of building types ranging from houses to museums and courthouses with stability and rigor, thus affirming that a single formal language can express more than one functional program.

The thesis has shown through the morphological analysis of the Islip Courthouse building that the final form of the building in the case of a strong program building depends on the interaction between the program and the formal language but is not determined by any. For instance, the courtroom floor in Islip responds to the linear growth model and the functional diagrams of the courtroom set, both of which are generic to the courthouse building type as seen in chapter three, and at the same time, it also responds to principles of order that are generic to the design language. Of course, the relational principles which are generic to the building type and the dimensional principles which are generic to the language are closely interrelated in the plan. One may, accordingly, suggest that in this case what architecture “adds” to “building” is neither

merely material forms, nor even relationships between forms, but, rather more fundamentally, principles that are applied to the relationships.

The strongest conclusion emerging from the morphological analysis of the Islip Courthouse concerns the relationship between program and language. It was suggested that at least in one case, that of Richard Meier, the language can be deployed as fully when confronted with a highly constrained building program as it can be deployed when confronted with a more weakly constrained building program. This leads to some important reflections on the distinction between highly and weakly constrained programs, or the distinction between strong and weak programs originally introduced by Hillier, Hanson and Peponis (1984). This distinction was aimed at establishing an important thesis regarding the generic social functions of buildings. In strongly constrained programs, functionality depends on satisfying particular requirements. In weakly constrained programs, functionality arises according to the spatial configuration of the building itself. This remains an important point which is entirely consistent with the findings of the thesis. However, the thesis warns us against extending the interpretation of strong and weak program to suggest that in weak programs designers have a greater opportunity to exercise their design language. The thesis suggests that design languages can be exercised with equal rigor in all cases. What they deliver may be different, from a functional or socio-cultural point of view, but their role in making form possible remains intact. It would be a mistake to imagine that in strong program buildings the “form designs itself” according to the functional requirements. Instead, the problem has to be recast in terms of the interaction between different kinds of descriptions: descriptions arising from the requirements of language and descriptions arising from the requirements of program. The extent to which each kind of description is rich may well vary according to the nature of the program and the language. Based on a single case study the thesis cannot propose hypotheses regarding the range of variation and its effects. It is clear, however, that strong program does not imply any lesser dependence on language in the process of design.

We do not fully understand a design by analyzing the interaction between program and form in the terms suggested above. A design is not a mere deployment of a design language over a functional program; it is also an expression of a specific intentionality which bears on the program and which is made possible by the language. The thesis has shown that in the case of Islip, for example, the creation of a “temple of justice” which suggests that “justice is sacred” can be reconstructed as the intention of the design. The important point, however, is to recognize, consistent with the arguments originally proposed by Langer (*Philosophy in a New Key*), Baxandall (*Patterns of Intention*), Bafna (dissertation) and Peponis (*Formulation*), intention should itself not be understood in linguistic terms even though language can be used to communicate something about it. The words “Temple” and “Sacred” acquire relevance within architectural design because they are already associated with formal motifs and principles. In the case of Meier, for example, we have seen how intentionality is expressed not only in generic principles according to which architecture is construed as a creation of the mind subject to abstract ordering principles, but also as a critical interrogation and incorporation of a particular formal vocabulary, that of Le Corbusier. Precisely because architectural intentions arise from within such a formal tradition, they are not readily translated into linguistic descriptions, nor is their translation stable. Thus, to those that recognize in Islip a nuclear reactor rather than a temple, the answer cannot be “you are wrong”. The answer can only be “your interpretation does not go a long way towards reconstructing architectural intentionality”.

This last clarification also point to an inherent limitation of the thesis. In reconstructing a design, one is reconstructing its internal order, not the manner in which it is likely to be received by the viewers or users. Reconstruction points to properties that are objectively there. It does not suggest that these properties will be necessarily recognized explicitly and even less that if so recognized they will also be held to be important. Neither architectural communication nor architectural persuasion is within the scope of the arguments presented in this thesis.

A further limitation of the thesis resides in its focus on a single case study. As it was shown in chapter four, Islip typifies characteristics which are common to many of the buildings that have attracted commentary over Meier's career. At the same time, Meier's architecture has evolved in diverse directions, both as a result of new avenues of experimentation and as a result of the growth of the practice and the concomitant emergence of several senior design partners. Even within the specialized field of courthouse design, Richard Meier has been involved in two buildings, the Islip courthouse and the courthouse at Phoenix, which looks quite different and have been designed in different branches of the office. In focusing on a single case study, however representative of broader stylistic trends in Richard Meier's work, the thesis cannot claim to have exhaustively dealt with the question: how can Richard Meier's architecture respond to the charge of courthouse buildings in general.

Besides the above mentioned limitations, the work carried out in this thesis can be expanded in different directions. The sample of courthouse studied should be enlarged in future studies in order to statistically support or challenge the findings of chapter three. The morphological analysis of the Islip can be further supported by looking at the design process of Richard Meier; looking at the different design sketches at different stages of the design process and talking to the people involved in the design in order to better understand the determinants of the final form of the building. Furthermore, post occupancy evaluation studies, especially with regard to users of the courthouse, can supplement the findings of this thesis through reflecting on the success or failure of the building to meet the design demands not only in both technical levels, and functional and behavioral terms, but also in aesthetic terms.

Finally, this thesis is a part of an ongoing research that aims at better understanding the design process in architecture as an interaction process between form, function, and architectural intentions on both a theoretical level and moreover and on an analytical level through the systematic morphological analysis of buildings and projects.

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